LIBRARY SEP 1419 UNIV. OF MI... LIBRARY

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CXXXIX. No. 2829.] LONDON, JULY 31, 1917. [69th Year. Price 6d.

O'NEILL'S

OXIDE

GAS PURIFICATION AND CHEMICAL CO., Ltd.

PALMERSTON HOUSE, LONDON, E.C.

Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 London Wall.

PUMPING ENGINES
All Types for ACID, &c.
CAST-IRON OR STEEL TANKS
Any Capacity.
CHEMICAL PLANT.
Roofs and Girders. Structural Work.
SULPHATE OF AMMONIA PLANT
Air and Gas Compressors.
MIXERS.
TAR STILLS AND CONDENSERS.
W. NEILL & SON, Ld.
Engineers, Iron & Brass Founders,
ST. HELENS JUNCTION.
Telegrams: 'Neill, St. Helens.' Telephone No. 20.

PURIFYING MATERIAL
"Brownox-de-Luxe."
Unqualified Satisfaction given where used.
SPENT OXIDE PURCHASED
J. BROWN & CO., Ltd.
Savile Town, DEWSBURY.

"TORBAY PAINT"
(REGISTERED TRADE MARK.)
The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C.
39/41, Old Hall St., LIVERPOOL.

"BLUEBELL"
SILICA RETORTS
(95% SILICA)
John G. Stein & Co., Ltd.,
Castlecary, SCOTLAND.

Makers of
GASHOLDERS,
TANKS (C.I. or Steel),
PURIFIERS,
WASHERS,
ROOFS,
&c.
ASHMORE, BENSON, PEASE & CO., LTD.
STOCKTON-ON-TEES.
Complete GAS WORKS
London Office:
80, Victoria Street, Westminster, S.W.
Telegrams: "GASHOLDER."

W. & B. COWAN
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON. MANCHESTER. EDINBURGH. GLASGOW.
SYDNEY. MELBOURNE. BRISBANE. WELLINGTON, N.Z.
(See Advertisement on page iii. of Wrapper.)

JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
80, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
14, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1845.

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

ESTABLISHED — 1861 —
Telegrams: "DRY METERS, LONDON."
Telephone: KENSINGTON, 1140.

George Glover and Co., Ltd.
RANELAGH WORKS
Royal Avenue, Chelsea
LONDON, S.W., 3.

Highest Awards at the Principal International Exhibitions.
Branches at LEEDS (9, Dewsbury Road) and MANCHESTER (Gaythorn Meter Works, Easton St.).

SPECIALISTS IN DRY GAS METERS—SLOT, KEY, AND ORDINARY.
Every meter leaving George Glover and Co.'s works, irrespective of size—and they build up to 3000 Lights—is regulated and tested for soundness at 12 in. pressure, and for registration not only at the ½ in. pressure prescribed by the "Sales of Gas Act," but at 3 in. pressure with full outlet capacity, so as to prevent "slow" registration even when the meter is overworked.
AGENTS FOR THE PATENT M. & M. SELF-LOCKING SLOT METER PADLOCK.

RITCHIE C.I. PIPES FOR GAS & WATER. MIDDLESBROUGH.

Every Mantle manufactured and supplied by the Welsbach Light Co., Ltd., is

BRITISH MADE

by British labour at the Welsbach Factory at Wandsworth, London, S.W. 18.

Welsbach Mantles have stood the test for well over a quarter of a century, and to-day are in greater demand than ever —a proof of their reliability.

THE ORIGINAL AND STILL THE BEST

The WELSBACH LIGHT CO. Ltd., Welsbach House, King's Cross, W.C. 1.

And at Birmingham, Bristol, Dublin, Hull, Leeds, Manchester, and Stoke-on-Trent.

DONKIN

for

GAS EXHAUSTING PLANTS.

VALVES. REGULATORS AND GOVERNORS, COMPRESSORS.

THE BRYAN DONKIN COMPANY, LTD.,

Head Offices & Works, CHESTERFIELD.

LONDON OFFICE: MILLBANK HOUSE, Wood Street, WESTMINSTER, S.W.

Chesterfield Telephone No. 84.
London Telephone No. 5388 Victoria.

Chesterfield Telegrams, "Donkin, Chesterfield."
London Telegrams, "Donkin, Vic. London."

GAS JOURNAL

LIGHT ⁂ HEAT ⁂ POWER ⁂ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXXXIX., No. 2829.] TUESDAY, JULY 31, 1917. [69TH YEAR.

EDITORIAL NOTES.

The Appeal for Maximum Coal-Gas Output.

IN this extraordinarily phased war, transitions of situation come rapidly, and decisions have to be varied accordingly, and that expeditiously. Not long ago, at the desire of the Coal Controller, we were urging gas undertakings, in order to economize coal, to mix a percentage of blue water gas or lightly carburetted water gas with respectably composed coal gas; and in this proposal, taken in conjunction with the conditions that are hovering over the industry and will assuredly settle upon it, there was seen future potentiality, to take advantage of which the present is a particularly opportune time. But already there is a diametrically opposing change. We now see the Coal Controller in active collusion with the Ministry of Munitions in appealing to gas undertakings to use their coal-carbonizing plants to the utmost extent and water-gas plants only to the measure necessary to meet surplus demands beyond the capacity of the coal-gas plant, or sudden flights in consumption which can be most promptly satisfied by the water-gas generators. Moreover, the Coal Controller [as the announcement published in the "JOURNAL" last week informed readers] is giving instructions for all necessary coal to be delivered to gas-works for carbonizing purposes, in order to help to relieve the newly-developed situation. The assurance can be given that nothing but the gravest circumstances would have induced this change of procedure—which, we believe, it may be said, is not due to any deficiency in the flow of the supply of materials for high explosives, but to another cause, which necessitates the maximum provision at home of "coal tar products." The richer the oil-producing character of the tar the better.

The new appeal to gas undertakings states that "certain "factors" have arisen which require a "reversal" of the policy which the Coal Controller, under the advice of Mr. Thomas Glover, had set afoot for producing economy both in gas manufacture and in coal consumption. We rather look upon the present appeal not as a "reversal," but merely as a suspension, of this policy; seeing that, if the "certain factors" are reversed or wiped-out, we shall have a re-establishment of the conditions that existed before these factors intervened, which would enable gas undertakings to return to the making and supply of a constant mixed gas. Although the necessitating circumstances are regrettable, it is, as a relief from an amount of anxiety in regard to coal supply, an excellent thing for responsible gas administrators and officials to know that the Coal Controller is going to give instructions for the requisite coal to be delivered to gas-works. But, in face of the change of appeal, it must be said that, when we come to reflect on the attenuated returns some gas undertakings are getting for the products required by the Ministry of Munitions and the poor controlled price for sulphate of ammonia, considering the cost of coal, materials generally, and labour—in short, the much higher level of all outgoings—with in many cases (under the sliding-scale) the present gloomy representation of a return upon capital, patriotism is being much strained, and Governmental reciprocity is something with which the gas industry would much like to make a more intimate acquaintance. Now what does this new appeal mean to gas undertakings? Many managements have been budgeting on some relief from dear coal by the utilization of a percentage of blue water gas; and, notwithstanding, the overall circumstances are such that in not a few instances charges for gas have had to ascend again, and dividends to descend still more. The appeal that coal-gas plant should be used to its utmost extent means that gas undertakings will be deprived of the anticipated economy of blue water gas, small as in cases it may be. It is all very well to say that the proposal is simply a reversion to the *status quo*. But every day the war burdens weigh heavier; and they, at all events, show no inclination to revert to the *status quo ante bellum*, or *ante* anything else. Search where the gas industry will, no compensations are found. It will, of course, comply with the new appeal. Patriotism is with it to-day a primary duty. But is it not time the Government did something to adequately compensate the industry, by redressing some of its grievances in relation first to the unfair return now being received on its capital through legislation which has had all the conditions upon which it was founded annihilated by the war, and by just payments to all undertakings, be they large or small, for the products that are being produced for war and fertilizing purposes?

There is, however, one suggestion that can be offered to the Coal Controller in connection with this new appeal. Naturally it means that a larger quantity of coal will have to be supplied to gas-works; and this larger quantity may, to a not inconsiderable extent, alter some of the plans made already by the Coal Controller. There are gas-works with an excellent margin of coal-gas producing plant; there are others that cannot boast a margin at all, without the use of their water-gas plant. Now the Coal Controller might consider whether he cannot secure a counterbalance to the increased supply to gas-works by, under his new household coal-rationing scheme, reducing the allowance per house where gas-cookers and gas-fires are installed, so ensuring their use instead of coal. In this way, he would be doing something that would help gas-works with good provision of coal-carbonizing plant to put more of it into profitable use, and at the same time they would secure some economy from their manufacture of blue-water gas. While making this suggestion, we are well aware that many authorities regard the published provisional plan as to domestic coal rationing according to the number of rooms in a house as complicated and unworkable. But if an attempt is going to be made from October next to work the scheme, there is no reason why a little more complication should not be introduced in the good causes of providing urgently needed "coal tar products," and of reducing the carriage of the "rations" by rail to the coal merchants, and the subsequent carting and labour involved in their local distribution, which will be an immense difficulty all next winter. It is easy enough for anyone to see that distribution of gaseous fuel by subterranean means is an economical procedure in these as at all times compared with road cartage and manual handling; and so this is a case where an additional complication in the terms of the rationing would produce some compensation in the directions indicated.

The Hackney Judgment.

THE first meeting of the Gas Light and Coke Company with the Hackney Borough Council over the question of "undue "preference" to electric power consumers in the matter of the charge for lighting, has resulted in Mr. Justice Astbury giving a decision in favour of Hackney. The judgment was delivered on Wednesday morning last; but apparently our electrical contemporaries were so astonished over the verdict that those issued on Friday were (with one small exception) unable to collect themselves for a comment upon the

event, together with a pæan of triumph. Perhaps they are going to reserve themselves for the decision in the Court of Appeal; for it may be conjectured that an issue of so much importance will hardly be allowed to stand where it is without submitting the matter to further judicial opinion. The position now is this—that, under the Long Eaton judgments, it is wrong for electricity purveyors to say: "We "will supply you at such and such a price for power if you "use electric light, but the price will be higher if you employ "some other form of illuminant;" while, according to Mr. Justice Astbury, it is not showing any undue preference, if the electricity suppliers avoid making the distinction, and say to all power users alike: "You may use up to 20 p.ct. "of your power consumption for lighting purposes at power "rates, which condition, although you get your power "supply at such low charges, does not give you any undue "preference over consumers for lighting at lighting rates "whose time of use and *quantum* circumstances in respect of "lighting may be entirely similar to yours." It seems to us that Mr. Justice Astbury has imported into the legal position a discrimination as to classes of consumers, instead of giving full weight to the characteristics or correspondence of supply; he has pronounced the Hackney power consumers who are allowed to use up to 20 p.ct. of their power consumption for lighting as being totally innocent of receiving any undue preference over other similarly circumstanced lighting consumers; and he has totally ignored all those refined fundamental principles upon which electrical tariffs have been constructed, and which have given such marked distinction to charges for energy used for power in the day time and for current expended for lighting after nightfall. In fact, his Lordship does not consider the lighting consumer is at all concerned in the matter if he is not a power consumer as well, because, owing to this fact, his circumstances are not the same. If he has no interest in the matter, then why under ordinary circumstances has there ever been discrimination between power and lighting, with the result that the average money product of the latter has always been considerably more than that of the former? That there should be a difference is right; but that being a power consumer so alters all the principles that apply to the charging for lighting as to justify the power user obtaining his lighting at power rates, and yet not confer upon him an undue preference over other lighting consumers, is something that defies the appreciation of any but those with the subtlety of the legal mind, and of those electrical purveyors who want, apart from the low price for power, some seductive condition in order to obtain and to retain the power consumers.

However, in Mr. Justice Astbury's judgment, the Hackney power consumers, being all treated alike, there is no undue preference, seeing that the circumstances of the lighting consumer only are not similar, nor is his a corresponding supply. Though the lighting consumer has no similar power circumstances, his lighting circumstances may be both similar and corresponding, and (given equal charges per unit) more profitable than those of the factory owner. The power consumers want light precisely at the same time as consumers who use current for lighting only; and it is during the hours of the rise of the output curve for lighting that all disinterested electrical engineers will aver that the average cost per unit generated is greater. Notwithstanding, his Lordship holds that there is no undue preference in allowing some consumers to have current for lighting during these hours at a price considerably lower than other lighting consumers. He appears to have here entirely misconceived the position. Let us briefly examine the course of the reasoning pursued by him. He says, and rightly, that "power users have a better load and diversity factor than "light users, which accounts for their being usually charged "a lower rate." Just so. A lower rate for power, and from which lower rate they get a full and sufficient—in some cases more than sufficient—reward. But their position as power users, seeing they already obtain consideration in lower price, does not make them better lighting customers than other lighting customers so as to justify supply for this purpose at power rates. Sections 19 and 20 of the 1882 Act, in his Lordship's view, do not say anything about, and do not draw any distinction between, light, heat, or power users as such. But this surely depends on the definition of "corresponding supply." The Act of 1882 bears the title "Electric Lighting Act;" and, when it was framed and passed, lighting was the supply contemplated—electric power and heating being subsequent developments. In the case of the *Metropolitan Electric Supply Company, Limited, v. Ginder* (which his Lordship quoted), the cause of grievance was that a large consumer was supplied at a lower price than Ginder, and for a daylight supply, which was a special circumstance the Company were entitled to take into consideration. But in this case Mr. Justice Astbury allows the power user to superpose upon his requirement of power energy an additional amount for lighting at the (as admitted by all experts) most inconvenient time for a power station, and at power prices! If this addition came in the daytime, well and good; but it is drawn when required, which is when daylight fails. If it is true that the generating cost per unit increases during lighting hours, then both his power and lighting consumption *at that time at power rates* imposes upon the other lighting consumers a positive disadvantage. Again, that there should be a distinction between the charges for power and lighting supply is acknowledged by the prevailing custom, based on accepted principles, of making some difference in the amount of the charges. But prevailing custom and accepted principles are both knocked on the head by the 20 p.ct. lighting allowance to Hackney power consumers.

His Lordship rules that dissimilarity of circumstances and non-correspondence of supply must be looked for "in "the circumstances of the customer in so far as they react "upon the supply that he takes." Very well. This being so, the quantity of current that happens to be taken at power rates, when darkness sets in, beyond the day power supply must react detrimentally on the general lighting supply, and in this way detract from the advantage of the manufacturer's day load, which *per se* entitles him to a lower price per unit (which he gets) than the consumer who takes energy for lighting purposes only. Therefore it is difficult to agree that this Hackney system of charging the power consumers power rates for lighting is one that is "fairly "arrived at." If the system is not fairly arrived at, the fact would exclude it from his Lordship's dictum: "*If* the "different systems of supply are fairly arrived at, and are "at the choice of the customer, the preference prohibited "by section 20 is between customers dealing under similar "circumstances, and not between customers dealing under "different systems of supply, either of which they are free "to select."

The reference to the sanction accorded by Parliament to power companies to allow their customers to use for lighting up to 20 p.ct. of their power supply appears to be somewhat irrelevant to the issue in this case. Parliament, so far as we know, has never expressly permitted this power to any urban electricity supply undertakings, but only to power companies without any general lighting supply authorization, which differentiates them from those who have such general authorization. The permission was no doubt a concession to the convenience of the customer, as many factories dealing with power companies may be outside the distribution systems of urban suppliers; and, if they were not, there would be the inconvenience of having to trade with two electricity suppliers. Partly, too, the limitation to 20 p.ct. is probably a protection to urban suppliers. The fact that it is an express authorization applying to power companies only is against its application where there is no such express stipulation. If the arguments used by his Lordship are correct, what particular virtue is there in the 20 p.ct.? Why stop at this figure? Why, indeed, not allow the power customers to use energy *ad lib.* for lighting at power rates?—that is to say, so long as "all factory or power users are "put on one basis, and all non-power users on another." If the 20 p.ct. is not introducing some preference, some special advantage—for what purpose?—why concede it? There is no reason for doing so. And nowhere in sections 19 and 20 of the 1882 Act is any specific discrimination made between power users and non-power users—"similar "circumstances" and "corresponding supply" are the only guiding considerations.

It is true there are distinctions between this Hackney case and the Long Eaton one; but there is an equal importance in it to the gas industry, in that it curtails the freedom of competition both for the power and lighting of factories, which freedom of competition it is to the interest of the industry to protect. There is no announcement yet of any decision as to taking the matter to the Court of Appeal; but it is to be hoped the Gas Light and Coke Company will be advised to submit the point to the Higher Court. In view of the Long Vacation, his Lordship has granted the Company an extension to three months within which to give notice of appeal; so there is no immediate hurry.

Determining the Gas Production Goal.

THREE of the gas papers that were read by technical members of the Birmingham Corporation Gas Department at the meeting of the Society of Chemical Industry, as reported last week, had the word "industrial" in their titles. Mr. E. W. Smith's contribution dealt with "Industrial Fuel "from Gas-Works;" Mr. W. J. Pickering's with "The "Calorific Value of Industrial Gaseous Fuel;" and Mr. C. M. Walter's treated of "Recent Developments in the "Industrial Applications of Town's Gas." Excepting the last-named title (although Mr. Smith referred to fuel other than gas, with gas taking foremost place), the reiteration of the term "industrial" might lead a layman to suppose that a special brand of gas is supplied by gas undertakings for industrial purposes; while, as a matter of fact, the gas that is of most general service—that will give the most value for money for the diverse purposes of industry, for private dwellings, public institutions, and catering establishments—is the one gas, subject to local conditions, that it is to the interest of the gas industry to supply. We must not forget in public discussions that, so far as gas is concerned, though big things are held in store for the gas industry by manufactories large and small and of all conditions of work, the domestic supply is the backbone of the industry's business, and for some undertakings practically the sole gas business, with, unfortunately, very little of the industrial kind intervening—"unfortunately," because the greater the diversity of day use, the better the load upon producing plant and distribution system, and therefore the greater the efficiency and economy.

This, however, by the way. There is one thing that at the moment the gas industry lacks, and that is an outlook, a goal, something definite to which to aim and to work for. We seem to be rambling leisurely about without any very good collective resolution, and certainly without any unanimous view of what is wanted, or what in the midst of the mutations of these times is the best course for the industry to pursue. The Government, through its war time organizations, appointed a Board of Fuel Research, a Coal Conservation Sub-Committee of the Reconstruction Committee, and the Board of Trade an Electric Power Supply Committee. Not any part of the work of these bodies has the gas industry in any way anticipated by research, by conference among its own men, and by coming to conclusions representing the approved technical and commercial opinion of the majority of the industry. The National Gas Council delegated to a Committee the work of following up the doings of these Government and Departmental appointments. After the local authorities and railway companies had been investigating the question of inert constituents in gas, and had found not a few town supplies sadly wanting in a reasonably good character in this respect, and after it had been pointed out that better by far is it to seek economy with cheaply made good combustible gas than false economy by depraving the flame temperature of gas and defaming reputation with keen competition all round, the Institution of Gas Engineers, in conjunction with the Leeds University, appointed a Committee for the purpose of research, with a view of eliciting guidance in improving and at the same time economizing in the production of gas. The Committee have mapped out a programme. But before the members can get seriously to work, the Board of Trade refers practically the same question to the Board of Fuel Research; and the gas industry is again found unprepared. It has no settled views on the matter, no finished plans, nothing concrete to place before the Board unless it be the private work of a few of the more enterprising of our gas undertakings.

It is a great pity. But it is the conventional way of the gas industry. It would be against its traditional character to be doing, without conditions forced action, co-operative work that had for its aim technical development. From this old habit we have to part. The industry must in future lead, and not be led. It must adopt its own policy, it must search out new practices that promise economy and higher efficiency either in production or use, and it must be so certain of its ground that it can educate and carry conviction to those who stand through nescience blocking the path of progress. And it must not be afraid to approach Parliament with its schemes, and prosecute them vigorously, and not take the first repulse as defeat. Mr. Smith (according to the reported abstract of his paper) says there is no doubt that the railway companies who, as large consumers in numerous gas-supply areas, are bent on having the inert gases in town gas limited, would not be satisfied with a good quality blue water gas of 300 B.Th.U., even if in that case the inert gases were less than in a good coal gas. No one wants them to be content with a blue water gas of 300 B.Th.U., but with a mixture, a percentage only of which would be gas of that variety. Of course, the blue water gas would have to be of good quality, or, as pointed out by Mr. Smith, the inert gases would be high. But no gas engineer would surely be foolish enough to supply a bad blue water gas when it is not a difficult matter by simple and proper regulation to make a gas with not exceeding 6 p.ct. of carbon dioxide in it, and (say) between 3 and 4 p.ct. of nitrogen, or a good 90 p.ct. combustible gas. If, as a result of the inquiry by the Board of Fuel Research, the Board of Trade are advised that there will be national economy in the provision of a good combustible mixed gas, we may be very sure there will be some accompanying restrictions which will give no room for carelessness or for imprudence. Mr. Smith has seen furnace work done with 300 B.Th.U. blue water gas; and the expenditure of B.Th.U. per lb. of metal compared favourably with that when using a good coal gas. The point about this is that the blue water gas units are produced more cheaply than are coal gas units, which at once points to the fact that economically the industry and the consumer are going to be prejudiced if a calorific value standard is instituted which prevents the pursuit of economy in legitimate directions. Mr. Smith cannot find any economic or scientific reasons for having fixed on 500 B.Th.U.; nor can anybody else who has really studied the question in all its bearings. Although a 500 B.Th.U. gas has been turned out by a number of gas-works, so far it has not been possible, he says, to produce such a quality of gas from average coal, using the ordinary methods of carbonization. We well remember the time when from Birmingham there was advocacy of a higher net calorific power than the present gross standard. But evidently broader thought on the subject has set in; and economy of production, economy of use, and the conditions actually here and with presaged proximity, are seen to have a co-relation that cannot be neglected.

In the reference to the Board of Fuel Research, they are requested to keep in view, in considering the question of the composition of gas, the secondary products of coal carbonization. Gas, of course, will continue the prime product. At the same time, there is no reason why gas should always be regarded as the product to which all else is subservient. Each product should have equality of attention. Those to which we used to apply the term of "residuals," which degraded their importance, have had their plane of usefulness raised during the war. "Secondary products" or "bye-products" should only be a term of classification. They are secondary to gas in no other respect. They are such an integral portion of the industry's work and business that they should not be relegated to any inferior place to gas, and more especially as this is a direction from which a big development in the economic position of the industry is going to be derived. In connection with its secondary products, the industry should see to it that its proper position in relation to after-war reconstruction is fully appreciated and taken into account. It is obvious that a cheap supply of good combustible gas is a necessary to post-war trade expansion. But there is all the crude benzol recovery, oil-debenzolizing, tar distillation, and dehydration plants that have been incorporated for national service in gas-works processes; and this is a line along which there can be large development in the gas industry, to the great advantage of the dye, motor-car, and other industries. Dr. Addison, the new Minister of Reconstruction, when Minister of Munitions, learned a great deal about these matters. In his new office, he is "to consider and advise upon the problems which may "arise after the termination of the present war, and, for the "purposes aforesaid, to institute and conduct such inquiries, "prepare such schemes, and make such recommendations "as he thinks fit." Among the schemes which he should, we consider, think fit to prepare should be one dealing with the gas industry's secondary products, including full liberty, to individual or groups of works, to develop them on the most economical lines without interference by parties interested for personal profit in curbing such development, or by short-sighted retarding legislation. Is the gas industry prepared to assist Dr. Addison in this matter?

We hope the Board of Fuel Research and the various Committees that have these matters now under considera-

tion will be able, without any delay greater than thorough investigation demands, to supply the gas industry with an outlook and focus the attention of its technical men on the goal for which they should work. Its principal competing industry is getting ahead of it in its investigation for economy, because it is seen that through economy, and that only, can come the cheapness that will gain the largest measure of commercial service. Between the two industries the struggle will be keen. The one offering the most economical service will lead in success; the greater the economy separating the one from the other, the greater will be that success.

The Meeting and the Dividend.

The Directors of the Gas Light and Coke Company have resolved to take advantage of their new Act, and not issue a report or statement of accounts for the past six months, nor hold a half-yearly meeting. This will, of course, save expense, labour, and inconvenience. It will also for the first time prevent our usual half-yearly investigation of the accounts, and thus will cause a break in a long journalistic custom, as well as in the completeness of the half-yearly review of Metropolitan Gas Affairs. We shall be left now with the South Metropolitan Gas Company and the Commercial Gas Company to give us an interim account of how gas affairs are proceeding in London itself, apart from the suburbs; and, of course, the time may come when these Companies will also follow the new fashion of holding only annual meetings. No doubt the proprietors of the Gas Light and Coke Company would have preferred, in these inordinate and momentous times, to have continued the half-yearly accounts and meetings; and this desire will be accentuated when they see the disastrous effect of the war time operation of the sliding-scale upon the dividend on their ordinary stock. The holders are to receive a dividend at the "statutory" rate of £3 14s. 8d. p.ct. per annum, which means £1 17s. 4d. p.ct., less income-tax, for the half year. The net receipt will be approximately 1⅓ p.ct.! The conditions of the times are not at all pleasant; but had the Royal Assent to the Company's Bill been deferred a few weeks, the proprietors would have had one more half-yearly meeting with their Directors. As it is, some will be pondering unaided the question as to how much their incomes are likely to be further reduced with outgoings constantly ascending, despite controllers for this and controllers for that.

Coal Topics.

There is a live interest everywhere as to the form financial control of the coal industry is to take under the Government control scheme. The coal owners know the lines of the draft scheme, of the Coal Controller; and, until there is an official divulging their mouths are closed up by the Defence of the Realm Act, which is found useful for innumerable purposes. But it is clear that coal proprietors are getting very chafed over the proposals; and now and again vent is given to irritated feelings. There was one of the members of the Board of the Ebbw Vale Steel, Iron, and Coal Company the other day (Mr. Beynon), at a meeting of the shareholders, asserting that the coal trade more than any other had unhappily come under the "blighting influence of Government control." But whose the fault of this—if true? The origin of control is found in the fact that the country—its people and its industries—were not only coming, but were soon under, in the early period of the war, the blighting influence of the coal trade. Hence the Limitation Act, and finally control. Mr. Beynon also said: "Enough is known for me to say that 95 p.ct. of the excess profits of the coal trade of the country will be taken either by the Controller or the Government; the fate of the other 5 p.ct. is problematical." From another source, it is to be gathered that the terms of financial control are now being put into legislative form, and will soon come before Parliament. Talking of control, there is also the coal distribution scheme. Mr. Calthrop is receiving suggestions for modification, and is patiently considering them with his advisers to ascertain if they contain the germs of improvement. It is understood that some slight modifications have been already secured; an important one being that Leicestershire has been added to the districts from which area No. 13 may draw supplies. On top of these important matters, the miners are again getting restless. Something is to be done in regard to the regulation and reduction of food prices, or (so say the Miners' Federation) they will want another 25 p.ct. per day added to their wages. The men are already getting daily fixed wages ranging from 9s. 5d. up to round about 11s.—most districts being in the neighbourhood of the latter figure. It is fortunate that a coal magnate is Food Controller, as Mr. Calthrop will look with confidence to him to disperse the new cloud which has been raised by the miners.

Six Months' Coal and Coke Exports.

The Board of Trade returns for June disclose how well the coal proprietors have continued to stand in relation to the values received for the much lower quantities of coal exported. This had been traceable from the almost unbroken tale of the monthly figures. Last month the quantity of coal, coke, and patent fuel exported was 3,666,068 tons, which was a reduction of 59,355 tons on June, 1915, and an increase of 162,113 tons on June, 1916. But the value of the exports last month was £4,899,526, which was an increase of £1,575,068 on the lower quantity exported in June, 1915, and even last month's values scored an increase of £147,549 over June, 1916, when 162,113 tons less were exported. This difference is reflected in the average value of the coal, coke, and patent fuel being reduced from £1 7s. 1d. in June, 1916, to £1 6s. 9d. last month. In the six months, the exports have been brought down, compared with the corresponding period of 1915, by close upon 4 million tons; but the value has gone up by no less than £7,121,489. This is a healthy condition. Compared with the first half of 1916, the value increased by £2,559,386, while the quantity exported went down by 1,043,316 tons. The exact figures for the six months [January to June] of the three years were: 1915, 23,377,174 tons; 1916, 20,504,687 tons; 1917, 19,461,371 tons. Values: 1915, £18,741,058; 1916, £23,303,161; and 1917, £25,862,547. The quantity exported during the six months was at the rate of about half that for the year 1913, which was one of exuberant demand; but the value now is about double that of 1913. Nevertheless, the coal industry is always finding cause for regret. The same value for half the coal exported! The other half still available for business elsewhere or at another time. Yet the reason now advanced for tearful discontent is that the collieries chiefly concerned are not working on such an "economical basis." Well, there is no pleasing some people.

The Union of Manufacturers.

In connection with the reference made on p. 141 of last week's issue to the registration, as a company limited by guarantee, and not formed for the purposes of profit, of the National Union of Manufacturers (Incorporated), we are now able to add that Mr. W. Beckford Long, the Secretary of the Gas Light and Coke Company, has been elected a member of the London Executive Committee. The inclusion of the name of Mr. F. M'Leod, the Secretary of the South Metropolitan Gas Company, has already been notified; so that the Gas Companies of the Metropolis are strongly represented in the Union. There are, besides the London Executive, two local Councils of the Union—one in Birmingham, with Mr. George Pike, of Messrs. John Yates & Co., Ltd., as Hon. Secretary, and the other in Sheffield, the Hon. Secretary of which is Mr. James Dickson, of Messrs. Henry Rossell & Co., Ltd. From these gentlemen, prospective members in the areas named can get all information they may desire. Full particulars can, of course, also be obtained from the Hon. Secretary in London—Mr. G. R. Cheesman, of No. 11, Paternoster Square, E.C. 4. The growing membership of the Union [which was formerly the British Manufacturers' Association, 1915] calls for a move at an early date to larger and more convenient premises. Though readers who may feel they would like to become members can learn anything they desire to know from the London Administrative Office, one possible query may be forestalled by stating that the minimum subscription is five guineas a year.

And the Federation of British Industries.

Another organization which is taking up an important position in the industrial world is the Federation of British Industries, of No. 39, St. James's Street, S.W. 1; and a word may be added here to draw attention to some recommendations this body are making for the development of the Government service for the promotion of British trade in foreign countries. The present position, as explained by the Director (Mr. R. T. Nugent), is that

a Government Committee, considering the question of the proposed reform of the Consular service, with the object of linking it up with trade and industry at home, heard recommendations from the Federation and from the Chambers of Commerce, as well as other evidence, and then issued a majority report and a minority report, which the Government have up to now refused to publish. The Federation desire to urge the need of altering existing conditions. It is pointed out that after the war the country's ability to pay its debts will depend on efficiency of production at home and on ability to sell its products abroad, in the face of highly organized competition. At present, foreign countries are dealt with by the Foreign Office (Consular Service), while the home market is handled by the Board of Trade. The first of the Federation's recommendations is that all activities undertaken by the Government for the promotion of British trade in foreign countries should be concentrated under the control of a single responsible Department; and another that, for carrying out this foreign commercial policy, a well-organized Commercial Branch should be added to the existing Foreign Office, working in the closest possible co-operation with the Political Branch. There are a number of other recommendations, for particulars of which readers must be referred to the Federation. The point to be emphasized here is that the Federation are apprehensive lest a final Government decision on the matter should be taken without consulting the industrial and trading interests in this country, which are chiefly concerned. Thus it is desired that publicity should be given to the facts.

Japanese Trade in Sulphate of Ammonia.

The British Commercial Attaché at Yokohama reports that the sulphate of ammonia imports into Japan from the United Kingdom have for many years past formed one of the principal lines of business between the two countries; but owing to the war the trade has been seriously interfered with. He shows what the imports of sulphate have been, and what proportion they bear to the total imports from the United Kingdom. According to an expert, the domestic supply of sulphate of ammonia in Japan was 37,600 tons for 1916; and the estimated output for 1917 will probably be 50,000 tons, which is still less than half the imports of 1914. For the four years 1913-16 the total imports of sulphate into Japan were: 110,635 tons, 104,800 tons, 19,790 tons, 7107 tons —all of which came from the United Kingdom except 2397, 1041, 1981, 4114 tons (respectively). He adds that there are in contemplation three new factories for the production of calcium cyanamide; but they are not working yet. Since the war, practically all the calcium cyanamide produced is being converted into sulphate of ammonia.

Principles of Industrial Administration.

A series of well-thought-out articles on a subject now engaging general attention, which appeared originally in the "Iron and Coal Trades Review" have been reprinted (with some considerable alterations) in more compact form as a book. The topic on which they treat is the "Principles of Industrial Administration." The author is Mr. George E. Toogood, who foresees that the time is coming when the industrial administrator—whether as statesman, employer, labour leader, or manager—will have to be more closely acquainted with the scientific aspects of his work, especially as regards the human factor. From this point of view, what he has to say may be commended to the careful attention of those whom it concerns, although no pretence is made to do more than sketch in the merest outline a sort of foundation plan of a structure which will be the work of many hands and brains. In the final chapter consideration is given to "Welfare Work," there being an account by the author of some investigations he has made, and which he thinks may be of interest to employers who have not as yet paid serious attention to this branch of applied science. While Mr. Toogood admits that, in the many subdivisions of what is termed welfare work, the Ministry of Munitions have secured throughout the vast works under their control a uniform policy of care and consideration for the worker as an individual which approximately corresponds to the highest level attained by the most progressive private firms before the war, we are glad to notice that he does not omit mention of some of the most prominent of the men on whose spade work the Welfare Section of the Ministry have thus built-up their administrative policy. Two of the leaders of industry named in this connection are Sir George Livesey and Sir Robert Hadfield, Bart. The book is published by Messrs. A. Brown & Sons, Ltd., of No. 5, Farringdon Avenue, E.C., at the price of 1s. net.

South Metropolitan Gas Company's Dividend.—At the half-yearly general meeting of the Company to be held on the 15th prox., the Directors propose to recommend payment of the statutory dividend at the rate of £4 13s. 4d. p.ct. per annum.

PERSONAL.

The distinction of Chevalier of the Legion of Honour has been awarded to M. LOUIS A. M. CROS, Manager of the Boulogne works of the European Gas Company. M. Cros is Captain in an artillery regiment.

The Leek Lighting Committee tendered their thanks to Mr. R. H. GINMAN (the Gas Engineer) for the assistance given by him during the past year in connection with the electricity undertaking, and recommended that his salary be advanced from £250 to £300 per annum, which the Council have agreed to.

Mr. H. B. HEATH has retired from his position as Secretary of the Plymouth Gas Company, and Mr. GEORGE H. BOLTON, who has been Assistant Secretary for the past four years, has been appointed Secretary. Mr. Heath had been in the service of the Company for the long period of 48 years, and filled the office of Secretary for 17 years. His resignation is due to ill-health.

Lieutenant A. BROADFIELD COHEN, of the West Yorkshire Regiment, who is reported to have been seriously wounded in action, is a son of Mr. Julius B. Cohen, Professor of Organic Chemistry and Dean of the Faculty of Science at Leeds University. The Lieutenant was himself a student at the University, and a member of its O.T.C., prior to the outbreak of the war.

Wireless Operator HAROLD WOODWARD, the son of Mr. J. H. Woodward, Manager of the Skipton Gas-Works, is at home, recovering from recent trying experiences. He was, under sealed orders, on board a collier transport which was sunk by a German submarine about 100 miles from land. Three firemen were killed. The survivors were three days and nights in open boats, in rough weather, before being picked up by a ship.

After seventeen years' service as Manager of the Scunthorpe Gas-Works, the Urban District Council have accepted the resignation of Mr. J. W. TURNER, who went to Scunthorpe from Torrington. When he was appointed, the Frodingham Iron and Steel Company, Ltd., were supplying gas to the town, the population of which was then estimated at about 5000. Mr. Turner has seen the population grow by nearly 20,000, and the number of gas consumers from 185 to 3472.

We are pleased to learn that Captain J. LENNOX STEWART, M.B., B.S. (the only son of Mr. James Stewart, the Editor of the "Gas World"), who is attached as medical officer to the Gordon Highlanders, and who was awarded the Military Cross last year, has now had a bar added for conspicuous gallantry and devotion to duty. The official record sets out that he behaved with the utmost gallantry in removing the wounded under shell fire. He continued to work in the open, exposed to severe shell and machine gun fire, until every wounded man had been brought in. Captain Stewart has been in the field almost continuously since the war began.

Conserving Fruit and Vegetables.

A topical subject has been selected by the British Commercial Gas Association for the August number of "A Thousand-and-One Uses for Gas." It is "Conserving the Nation's Produce of Fruit and Vegetables"—a matter of prime importance at a time when despairing efforts are being made by our enemies to reduce the country to starvation. In order that the fullest possible benefit may be derived from the tremendous efforts that have been put forth to increase the crop of fruit and vegetables, it is, of course, essential that the marketing of the produce should not take place all at once; and therefore the authorities are urging growers to instal evaporators, so as to enable them to dry their surplus fruit and vegetables, instead of sending them to overstock the market. The article before us illustrates and describes different forms of evaporating apparatus for this purpose—both gas and coke heated. All the machinery, too, for making the plant at the works of the British Fruit Evaporator Company is stated to be driven by a gas-engine. The aspects of the matter here referred to are those which appeal to the nation, and from their own special standpoint to the gas industry. But the individual consumer, as such, has also an interest in the subject; evaporation, as explained, is a clean process. The consumer will realize how nearly the question concerns him if he reads what is said about the methods hitherto adopted for drying grapes in Spain and sultanas in Afghanistan.

Calorific Standard Application and Orders.—The Board of Trade have received an application from the Derby Gas Light and Coke Company for an Order fixing a calorific standard of 500 B.Th.U. The Board have made Orders for the Clevedon (Somerset) Gas Company and the Winchester Water and Gas Company.

Natural Gas in Kansas.—According to the latest authoritative figures, the States of Kansas and Oklahoma produced in 1914 22,627 million c.ft. and 78,167 million c.ft. respectively, or a total of 100,794 million c.ft., of natural gas. The total natural gas consumption of the United States for the year named was estimated at 591,866 million c.ft., which would credit the Oklahoma-Kansas field with about 18 p.ct. of the supply.

GERMAN ASSOCIATION OF GAS AND WATER ENGINEERS.

Annual General Meeting.

The Fifty-Eighth Annual General Meeting of the German Association of Gas and Water Engineers was held on June 22, at the premises of the Association of German Engineers in Berlin. The following summary of the proceedings is taken from the reports in the "Journal für Gasbeleuchtung," by the official reporter of the meeting, Herr Heidenreich. The first portion is a general review by him of the circumstances in which the meeting was held, and the second portion the minutes of the proceedings.

Review of the Meeting.

The proceedings, like those of the two preceding years, were restricted to a single day, and were shorn of the festivities of earlier years, though there was an informal gathering of members at the Zoological Gardens on the evening of June 21. About 370 members and visitors attended the meeting, which was a larger muster than had been anticipated; and, as the meeting hall at the Association of German Engineers has seating accommodation for only 250 persons, a considerable proportion of those attending the meeting were obliged to stand throughout the proceedings—the fact that they were content to remain in such conditions being proof of the general interest aroused by the programme. The large attendance also testified to the wide-spread desire of members for an opportunity for a private exchange of views on the experiences of the present time.

Gas-works are now in a serious economical position. Coal supply has overshadowed all else for some months past. Negotiations and conferences have so far effected no improvement; and the gravest fears are now entertained for the autumn and winter. The meeting stood under this cloud; and it was the question of the coal supply which was chiefly responsible for the large attendance. No one could have expected that the meeting would solve the problem, and send him home with the key to the solution in his pocket. But everyone left the meeting with the conviction that the interests of the gas industry—with all that they mean for the commonweal and the fatherland—were being cared for by the Council of the Association in the best and most vigorous ways possible in prevailing circumstances. This was especially true of certain projected measures, conceived with the best possible intentions, but with lack of insight into the great economic importance of gas supply, which would certainly have produced a catastrophe. Especially are thanks due to Herr Häse, of Lubeck, the President of the Association, who has busied himself in preventing damage to the industry, and, so far as measures have been necessary, for restricting the coal requirements, has seen to it that they were formulated in a sensible and just manner.

Matters handled by the President and disposed of in the proceedings of the meeting from the point of view of the expert included: The elucidation of the industrial conditions, free discussion on the experiences of members, the adoption of preventive measures against threatening troubles, the establishment of the proper lines for future work, and the enlightenment of the influential government offices and public authorities as to the further development of the work of the industry.

The Inaugural Address of the President, delivered with his customary skill, was received with rounds of applause. He reviewed the strategical results of the efforts of the German and its allied armies, as well as the industrial loss caused by the war, and the interruption of idealistic achievements. The President next gave his paper on "The Position of Gas and Water Works in War Time," which was the only technical item of importance on the programme. From carefully compiled material and data, he demonstrated the immense importance of the gas and water industries both for the general welfare and the conduct of the war. The reading of this paper was followed by a general discussion on the coal supply, the coal-tax and its effect on the economic position of the gas industry, the storage of coal, the disposal of bye-products, the heating problem, general gas-works questions, and the use on gas-works of electromotors unattended by risk of causing explosions. Finally, some water-works questions were also discussed. A full report of the whole discussions is promised later.

The internal business of the Association was next dealt with. Herr Geyer, of Augsburg, was elected as one of the two Vice-Presidents of the Association in succession to Herr Terhaerst, of Nuremberg, whose term of office had expired. Herr Häse, the Manager of the Gas, Electricity, and Water Works of Lubeck, was re-elected President of the Association, whereby he enters on his third year of office.

The business of the meeting having been finished, the members assembled at the Rheingold Restaurant for an informal luncheon, and a large proportion of them returned there for the evening repast. On the latter occasion, the President communicated the result of an interview which he had had with the Imperial Commissioner responsible for the distribution of coal. Members parted with expressions of hope that the ensuing year would bring forth peace, and that the next annual meeting would be held in more favourable circumstances.

The review of the proceedings concludes with a retrospect not only of the years of war, but of the earlier years of peace, when so many representatives of countries now at war with Germany attended the annual meetings of the Association. It is said that the last meeting in peace time—viz., that at Munich in 1914—calls to mind the Gas Exhibition held that year in that city, which drew visitors from all the nations now at war. Carrying the thought back further to the time of complete harmonious understanding with England, now Germany's "chief enemy," who, in the autumn of 1910, when numerous representatives of the German gas industry were so hospitably entertained in London, Edinburgh, and Glasgow, could have dreamed that things would have developed as they have? Even at that time though, relations with Germany were a little strained by the English jingo Press. But in one of the speeches of welcome, a distinguished English gas engineer expressed the hope that the sea would always be large enough for the two navies to manœuvre without clashing, while on the last day one of the English hosts spoke of his "German brothers." Who would have thought at that time of the Skagerrak or the clash of our armies on the blood-soaked fields of France and Belgium? How many peaceful relations between the warring nations have since been broken! Is it everywhere, and for ever?

When the world returns to its senses (the retrospect concludes), and new ties are formed between the nations now at war, many old ties also will await resumption. It may be hoped that, in England as well, people will not generally think so chauvinistically as the technical papers which reached Germany some time ago disclosed. So far as is known, two respected members of the German Association, Herren L. & E. Körting, still appear in the roll of the Institution of Gas Engineers as honorary members; and, so far, no one has suggested that Sir William Lindley should be struck off the list of members of the German Association any more than any other of all the hostile alien members of that body. May better understanding soon bring about a peace which is honourable for all, so that the industries represented by our technical institutions can enjoy further successful development!

(To be continued.)

ELECTRICITY SUPPLY MEMORANDA.

There is no recollection of the event, but we accept the statement of the impeccable "Meteor" of the "Electrical Times" that it is so. He asserts that some five or six years ago, he announced how important it was from the military and national point of view to control all public lighting independently of the ordinary distributing mains. This was said, we feel certain, without our friend being in any way in the confidence of the All-Highest or any of his infamous satellites; though, of course, there was nothing new in the idea of methods of prompt lighting and extinguishing of street-lamps. In various places, it was then already in existence in connection with the control of street gas-lamps by the pressure-wave system, which, unlike electricity, does not need a separate circuit. However, "Meteor" thinks that it would have been an inestimable blessing during the war to have had separate electric circuits for public lamps, so as to have given immediate control over them. It would also have vastly altered and simplified the condition of things had the appliance necessary for the pressure-wave system been applied wherever possible before the war to public gas-lamps. "Meteor" also describes the suggestion of certain correspondents of the "Daily Mail" as a very "sensible" one, that the public electric lights should be used for signalling raids; and then he proceeds to show that the "sensible" suggestion is a very foolish one in these days, in view of the fact that the street-lamps have been so badly dealt with by paint and shades that no one would be conscious of their illumination if the sun was exerting its strength. But there is another aspect of the matter. The lighting-up of the street lamps would be of no use whatever as a signal to people in houses. It would have been no use on the morning of last Sunday week when people were having a final snooze in bed, or were engaged on their matutinal ablutions, and the sound of aerial explosions sent them smartly to the safest quarter in their houses. What good would the lighting of the street-lamps have been on that occasion, or the policeman with his silent "Take Cover" notice?

Signalling Raids.

But "Meteor" goes further. He thinks this separate circuiting of the public lamps would be for the public welfare; and therefore the electric undertaking concerned should not have to foot the bill for making the change. Why not? The system would save a certain amount of labour. Lighting authorities or gas undertakings have had to pay for automatic lighting and extinguishing devices, and for the application of the pressure-wave system. However, the electrical industry was always great in the matter of getting other people to pay. The ratepayers have to pay where, in the case of local authority undertakings, there is mismanagement or under-charging. "Meteor" thinks, too, this is only a minor example of the burden that the nation may have to shoulder if it is to derive the maximum benefit from electricity supply. For instance, if the conservation of our fuel supplies requires that there shall be a complete revolution in the generating practices of the industry—well, the State should pay for effecting the change. The electricity industry says

State Aid.

"Meteor" could not possibly countenance the loss that would be entailed; neither ratepayers nor shareholders would put up with it. But the State might do so deliberately, since in the long-run it would repay it handsomely to disburse this cost of initial establishment. In other words, the State ought to pay to get the electrical industry out of the uneconomic mess in which it finds itself. "Meteor" has wonderful faith in the State. He does not know it. He has never heard of Shylock the Jew and the prodigal son being participants in that wonderful thing known as the State. The gas industry has had to pay for much work in connection with the recovery of various products for war purposes; and it gets fixed paltry amounts for the products, which do not pay some undertakings, and leave them with an actual loss. Gas undertakings may grumble. The State is thick-skinned, and is used to that. It commands and commandeers; it is paramount, it makes its own rules and determines its own payment, without so much as "by your leave." In some cases it is parsimonious; in others prodigal. It is too much to expect the State to tread a straight line midway between the extremes. The electricity supply industry must not look for presents from the State just now.

The Coal Controller's Advice.

Among the Coal Controller's recent recommendations for the saving of coal carriage and traffic next winter was the one that the installation should be pushed of both gas and electric cooking and heating appliances. There are two drawbacks in some districts so far as gas is concerned—one is the comparatively few fitters left; the other is that last heating season on several cold days the gas plants had to bear continuously flights of 40 to 50 p.ct. increases in demand, besides having to meet the high peaks for cooking for the midday meal, and for cooking in the evening on top of the lighting load. The elasticity provided by storage and water-gas plants is curbed by the oil difficulty to the degree that blue water gas can be mixed with coal gas without unduly depreciating quality. And extra gas-producing plant is as precious and difficult to get as many other commodities in these days. But the providers of electricity are in worse case. How many of them could stand beyond the normal demand the continuous strain of a 40 to 50 p.ct. increase in output for days together, with intermittent demands for cooking such as the gas industry has to face? Plant, cables, fuel supplies would not stand anything of the kind. Unless, too, coke is employed under the boilers, electrical stations also destroy all the value that is in the coal for the one purpose of raising steam. Recommendations are very well, if practicable. The electrical people are pressed for wiremen and fitters, as is the gas industry for skilled labour. From the consumers' point of view, there are other considerations. Electric cooking and heating appliances are relatively expensive in first cost and upkeep; and the cost of using them is something that makes even Park Lane pause. Prices for electric current for heating purposes have lately gone up in many places. For example, we see that Stoke Newington has raised its heating charge to 2d. per unit. A couple of units used in a room per hour means 4d.; for twelve hours' use on a cold day in the room the heating expense would be 4s. Allowing 75 p.ct. efficiency for a modern gas-fire, the same amount of B.Th.U. (presuming for the sake of generosity 100 p.ct. efficiency for the electric heater) could be transferred to a room by the expenditure of from ½d. to ¾d. per hour for gas at war prices. Another point is this: Assuming an average use of 4½ lbs. of coal per unit generated, two units would mean the consumption of 9 lbs. of coal, which at 14,500 B.Th.U. per lb. would be equal to 130,500 B.Th.U. There would, of course, be no occasion to consume this amount of coal per hour for heating an ordinary room, but supposing it was so used in a coal grate with 20 p.ct. efficiency, the householder would project some 26,100 B.Th.U. into his room, as compared with 6840 B.Th.U. by electricity—granting, we repeat, for the sake of generosity, 100 p.ct. efficiency for the electric-heater. The 9 lbs. of coal and the 26,100 B.Th.U. would cost the householder, at 34s. per ton, just under 1·7d., compared with the Stoke Newington 4d. for 2 units of heating energy and 6840 B.Th.U. Of what advantage in the matter of fuel economy would the change be to the householder or to the country? The 9 lbs. of coal would produce (without reference to coke and the other secondary products) 50½ c.ft. of gas, which would on combustion give, at the parliamentary standard of 500 B.Th.U. per cubic foot, 25,250 B.Th.U. This quantity of gas could be purchased (at 3s. per 1000 c.ft.) at 1·8d.; and it would with the modern gas-fire give to a room 18,936 B.Th.U. A couple of units of electricity used per hour would not have gone far in the heating of a decent-sized room on the severely cold days last winter. The Coal Controller is, of course, considerate in giving the householder the choice of two labour-saving methods of heating; but the householder will no doubt be careful to make selection of the one that best suits his own pocket. Some gas undertakings, like the coal merchants, are at the present time suffering from no little embarrassment owing to the importunities of local authorities and householders in connection with cooking and heating appliances.

The "Increasingly Popular" Electric-Heater.

However, there is great joy in the electrical industry when a few more units of electricity are sold for heating purposes. The writer of "Heating and Cooking Notes" in the "Electrical Times" says that at Winchester there was last financial year the "gratifying increase" of 54,152 units used for heating and cooking. The Electrical Engineer (Mr. R. Ayton) in his report only mentions "heating purposes" and not cooking; and he thinks the increase is "most satisfactory." The twelve months included the severest winter that has been known for many years. Mr. Ayton considers the use of electrical energy is becoming "increasingly popular;" and he thinks that the inquiries received show that consumers of energy for this purpose are "generally" satisfied with the results. Assuming that Winchester uses an average of 4½ lbs. of coal per unit, the increased consumption of electricity for heating would mean the expenditure of about 108·8 tons of coal, from the use of which coal in their coal grates householders could have obtained much more heat for room warming. The additional units referred to are equal to 185,199,840 B.Th.U., or 370,399 c.ft. of gas. At 3s. per 1000 c.ft., this quantity of gas can be purchased for £53 12s.; at 3s. 6d., at £64 15s. There is a vast difference between these figures and the £225 12s. 8d. which the 54,152 units cost the consumer, assuming a charge of 1d. per unit. And the electric heater while it is credited in the lecture room by professors with 100 p.ct. efficiency, can truly claim nothing of the kind. So, again, there is a disadvantage in comparison with solid fuel and gas—particularly the latter, because of the cheapness of installation and upkeep. Labour saving over solid fuel is, of course, about equal between gas and electricity; but reliability stands higher with the former than with the latter.

Simpson's of the Strand.

The same writer of "Cooking and Heating Notes" is much exercised over the recent case in which Simpson's of Strand fame were concerned. They were summoned for using a quantity of meat in excess of the allowance for the number of meals served to customers. Sir Archibald Bodkin, of course, had to make out the best possible case for his clients when before the magistrate; but we think—in fact, we are sure—that he must have fallen into error when he said that the 5-oz. allowance of meat per customer came down to 2½ oz. after the meat had been cooked. On the face of it, this is a "loss" of 50 p.ct. The "Cooking and Heating Note" writer, by the use of "Ifs," obviously has some doubts as to whether Sir Archibald was not inadvertently stretching the wastage a bit. He does not wish to write himself down a witless fellow; yet he cannot avoid making the most of Sir Archibald's statement. That dear old lady—Mrs. Beeton—never, not even in the days of her youth when efficiencies were not as they are now, credited gas or coal with a wastage anything like that figure. No hardly-pressed electrician for a point with which to attract the public ever ventured into so vast an extravagance; and even the much lower percentage that the electricians have appropriated from Mrs. Beeton, or by copying apocryphal statements, they have refused to support by having tests carried out at equal temperatures and to equal degrees of cooking in open competition. All along it has been a pretty little game of deception to secure custom. Of course, our friend who has fastened on to this statement of Sir Archibald very well knows that at a place like Simpson's, with their knowledge of what their customers want, and with their reputation for choice cooking, do not waste 50 p.ct. of meat in its preparation. But he has a recommendation to make; and it is that electric cooking should be adopted, which would (so he says) result in only about 10 p.ct. of waste. Our all-knowing friend puts it that a customer would then receive 4½ oz. of cooked meat instead of 2½ oz. as at present. Would he? If he will make inquiry, he will probably find the 5 oz. allowance includes bone; the portion placed on the plate of each customer is *minus* the bone. He understands that both coal and gas are used at Simpson's; and he concedes that no doubt the apparatus is as efficient as is possible with such means of heating. Of this, we cannot speak. But there is gas cooking and gas cooking apparatus. We ask him to justify the 50 p.ct. loss of meat with "the reputation for good cooking justly held by Simpson's;" and to explain how a reputation for good cooking could have been earned with gas and coal apparatus. While he is about it perhaps he will tell Simpson's as to the limitations of the electric-range which are not compensated by lower costs, greater convenience, a larger range of regulation of temperature, a greater latitude from rapid to slow cooking, and a bigger range for boiling operations than the gas-cooker.

Troubles of Arc Lights.

Arc lighting seems to be in a bad way for street purposes. It is a jumpy, independable, labour-wasting system; and so, in order to save the face of electricity, the more sober, but eye-smiting gas-filled (or so-called "half-watt") lamps are taking the place of arcs. Some of the troubles occasioned by such lamps have recently been told in a London County Court, when a taxicab proprietor—one Prust—sued the Westminster Corporation for damages to a taxi-cab, caused by a collision with another cab owing to, he alleged, the Corporation having negligently allowed the electric light to "go out" at one standard. For the defence, it was pleaded that, though the very best carbons were used, they would at times fail to drop properly, and out would go the light. The Westminster Corporation it appears keep three men constantly on duty to attend to light failures. They even "pay the police to give them information of any failure of light." On this occasion, the Corporation were informed that the light had gone out, and sent as quickly as they possibly could; but unfortunately the accident occurred in the meantime. It is clear the electric arc lamp would not, among public lighting agents, take first prize for reliability.

HOLIDAYS: AN ADDENDUM.

By A. C. W.

It is gratifying to one who, in the intervals of business, occasionally gives public expression to thoughts on some subject of general interest, when he receives spontaneous words of commendation. The writer's short article on "Holidays" [see "Journal," June 19, p. 567) has called forth such words from several quarters. Those from a member of the Town Council of Edinburgh are so wise and so well-expressed that they deserve publicity:

I was greatly interested in the little article on "Holidays," and in the remark of Burke's which you quote. The pressure of war work and war conditions reminds us of its urgent truth. We continually forget that the mind, no less than the body, must from time to time retire to the quiet retreat. This incessant work, which for many rapidly becomes a mechanical process, is starving character, and results in the loss of a great deal of constructive thought, of the highest value to the State and to the world. I think I have mentioned to you "The Celtic Temperament" and other works of Francis Grierson. In a tribute to Grierson on one occasion Maurice Maeterlinck said he was privileged to "breathe the atmosphere of supreme spiritual aristocracy which emanates from all your work." That is what we want to cultivate. But this rush is dead-against it; and I believe that, great as is the loss in private life, it is infinitely greater in public work, where one man given to a little sober thought is worth a score who rush from meeting to meeting under the delusion that they carry the burden of humanity on their slender shoulders.

SIXTY YEARS AGO.

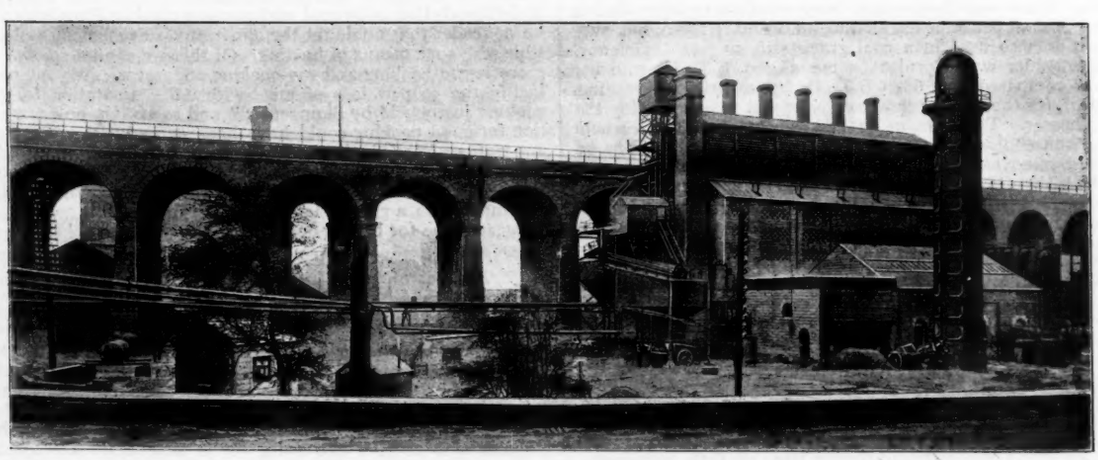
From the "Journal" of July, 1857.

Disposal of Coke.—Now that the question of the price of gas has, with few exceptional cases, been satisfactorily adjusted throughout the length and breadth of the Empire, the question, "What are we to do with our coke?" has become of almost paramount importance to the gas manufacturer. Experience has demonstrated that the demand for coke has not kept pace with the consumption of gas; and, in spite of the active canvassing of shareholders and their friends in their own limited circles, the markets for coke are everywhere glutted to such an extent that, when the stores become filled, the brick and lime burners clear off the surplus on ruinous terms. Numerous expedients have been suggested for the remedy of this state of things; and many of them have been tried with partial and very dubious success. Some of the large producers have sought distant markets in the manufacturing districts, to the manifest injury of the local gas-works. Others have reduced their price to such an extent that, though they may have doubled the quantity sold, the return in money has not much exceeded what it was at the higher rate. Indeed, the consumption for domestic purposes appears to have reached its limit in most places in this country, and to be incapable of any important extension even by material reductions in price. On the other hand, several gas engineers have directed their attention to the perfecting of some system by which the yield of gas from a given quantity of coal can be considerably increased, and the production of coke be thereby diminished; while others have proposed so to improve the quality of the coke itself, as to allow of its being used for locomotives and metallurgic purposes. The patent taken out by Mr. Croll in January last, in which he proposes to introduce a stream of small coal or dust into an inclined retort by means of a self-feeding apparatus, is an example of the former; and, if this system is successfully established, it would diminish by one-third the coke produced in our large gas-works. Our neighbours across the Channel, who are suffering under the same difficulty as the English gas manufacturers, have particularly examined the question of the possibility of collecting the gaseous products of closed and externally heated coke-ovens, and have succeeded in obtaining a coke greatly superior to that made in the ordinary ovens; while the gas, according to the report of M. Regnault, the distinguished chemist, is in no perceptible degree inferior, either in quantity or quality, to that obtained from the same coal by the ordinary process of distillation.

Coal Colliers.—The experiment about to be made in the conveyance of coal by leviathan screw-colliers, is watched with much interest by all consumers of the commodity, and more especially by the Metropolitan Gas Companies, as expectations are held out that half the present rates of freight will be remunerative; and, if this prospect is realized, it will revolutionize the whole gas-making trade of London.

LONGWOOD GAS COMPANY'S NEW WORKS.

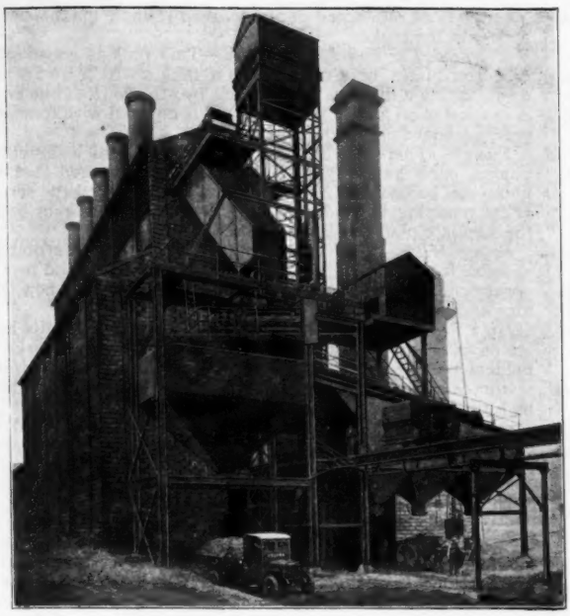
There was an interested party of guests last Thursday to inspect the new gas-works which were erected during 1915-16 for the Longwood and Slaithwaite Gas Company. A tour of the works was made by the visitors, under the guidance of Mr. J. H. Brearley (the Engineer), Messrs. J. W. Broadhead and Toogood (of Messrs. R. Dempster & Sons, Ltd.), Mr. Thompson (of Messrs. Drakes Ltd.), and Mr. Oxley (of Messrs. George Waller & Son, Ltd.). During the inspection and by the different speakers at the subsequent luncheon, both the arrangement of the works and the forward policy pursued by the Directors of the Company were favourably commented upon. The troubles that Messrs. R. Dempster & Sons, Ltd., and Messrs. Drakes Ltd., had had to contend with were also fully acknowledged—Mr. Brearley remarking that it was almost a surprise that the work had been completed at all, in view of the difficulties that had had to be faced.



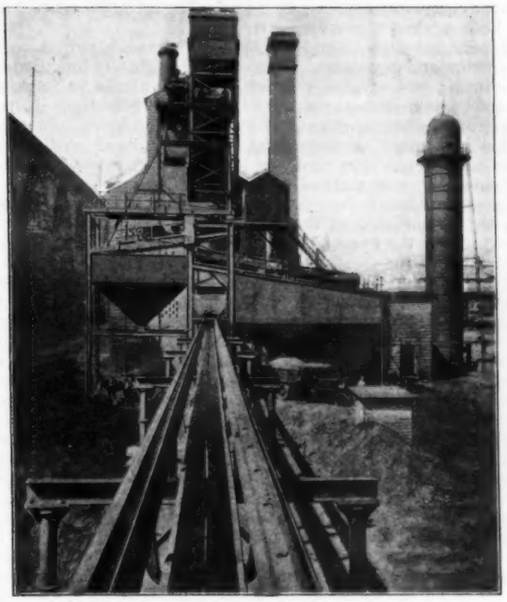
GENERAL VIEW FROM THE OLD GAS-WORKS.

DESCRIPTION OF THE WORKS ERECTED DURING 1915-1916.

The Longwood Gas Company serve a district in which the staple trades are textile, with the manufacture of woollen goods greatly predominating. The local manufacturing firms have all shown great enterprise; and the district supplied has in consequence developed considerably. The quantity of gas sold in the year 1895 was 37,000,000 c.ft. In 1915, the amount of gas sold was 192,000,000 c.ft. In 1916 there was a set-back, which, it is believed, will be but temporary, due to lighting restrictions, &c. The quantity sold in that year was slightly under 177,000,000 c.ft. The growth in output, however, is not entirely attributable to industrial developments, but is also accounted for in part by amalgamation with other gas companies. In 1901, the works of the Colne Valley Gas Company were absorbed, the output from



HOIST AND COKE SCREENING AND STORAGE PLANT.



GABLE END, SHOWING THE 70-FEET HIGH COKE-SCREENING PLANT AND YARD GANTRY.

which was approximately 14,000,000 c.ft. On Jan. 1, 1915, amalgamation with the Slaithwaite Gas Company took effect. The gas sold from these works in the preceding year was 56,000,000 c.ft. About two years before the amalgamation, the Slaithwaite Gas Company had made a very favourable offer of their works to the Slaithwaite Urban District Council; but this was not accepted. Consultations were then held between the Boards of the two Companies; and, owing to the growth in the demand for gas, and the necessity of providing for future requirements by way of extensions, it was concluded that it would be to the advantage of the district to concentrate the supply at a single works, thus affording greater latitude of choice in regard to the economical adoption of mechanical equipment. After visiting several works and inspecting various systems of carbonization, it was ultimately resolved to adopt the "Dempster-Toogood" system of continuous vertical retort carbonization. This is described to-day on pp. 192-5. The remainder of the plant was installed by the following contractors: Boilers, steam and water connections, water-softening plant, gas exhausters (Wallers'), Livesey washer, tower scrubber, rotary washer-scrubber (Holmes), purifiers and house, tar and liquor tanks (underground and overhead), pumps (tar, liquor, and water), yard connections, and foundations for the plant—Drakes, Ltd., of Halifax. Gas-compressors—George Waller & Son, of Stroud. Rotary Meter—Rotary Meter Company, Ltd., of Manchester. Six-in. high-pressure main from Longwood to Slaithwaite, including governors—Nicholson & West, Ltd., of Halifax.

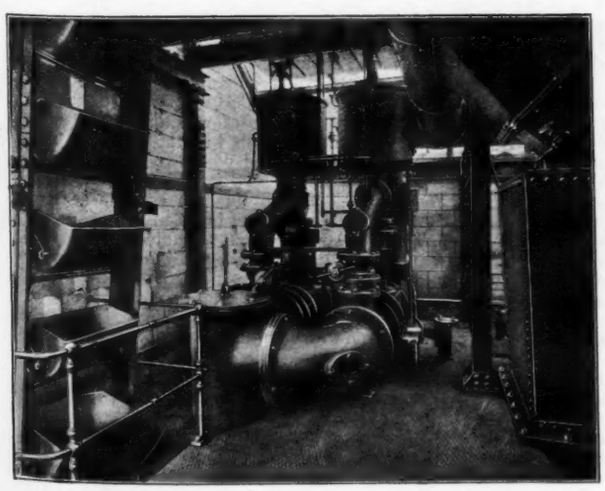
Boilers.—There are two Lancashire boilers, one 28 ft. long × 7 ft. 6 in. diameter, of J. & J. Horsfield's make, and the other 24 ft. long × 7 ft. diameter. Both are fitted with Wilton's patent forced draught breeze furnaces, and work at 100 lbs. steam pressure. The water-pipes are arranged to allow of either boiler being supplied with water by the injector or the feed pump, from the town's supply, or from the water storage tank, as desired.

Water Softening.—The water-softening and purifying plant is of the Wilson patent type, and is arranged so that the water, which is pumped from the beck, is first passed through a roughing filter on to the mixer, where the reagents (which in this case are copperas and soda ash) are added, and then into the overhead storage tank, whence it passes through the final quartz sand filter to the clean water supply tank, from which the feed pump or the injector draws. The plant is capable of passing 1000 gallons per hour, and is so designed that the treatment does not vary, however much the rate of water supply to the plant may fluctuate, as it automatically regulates the amount of reagent to suit the rate of flow through the plant. The filter-beds can be perfectly cleaned without putting the plant out of action.

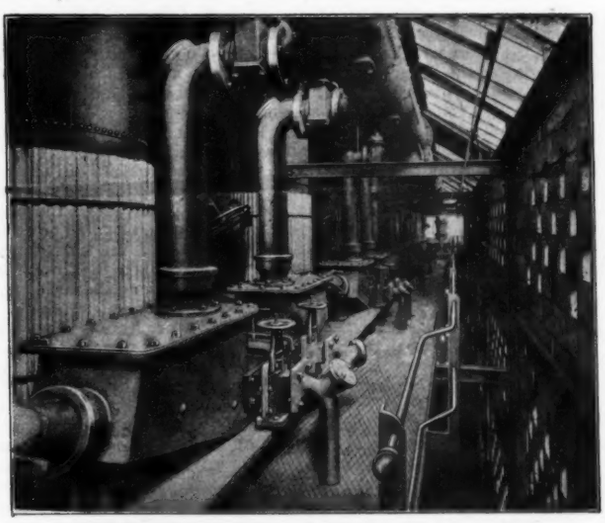
Power-House.—Herein are installed the duplicate generating sets for supplying the electric current for the vertical system and the coal and coke handling plants, steam-driven exhausters in duplicate, steam-driven gas-compressors in duplicate, suction pump for supplying water from the beck to the water-softening plant, boiler feed pump, gas gauges and recorders, and emergency gas-engine and electric generator for use in the event of any stoppage of the steam-raising plant.

Gas-Exhausters.—There are two Waller four-blade Beale type exhausters, each capable of dealing with 50,000 c.ft. of gas per hour at 80 R.P.M. Improved type steam and gas governors are provided; and each set is fitted with a small air-blower for revivification of oxide *in situ*, which is belt-driven from the main shaft, and is capable of dealing with 2½ p.ct. of the nominal capacity of the exhauster.

Gas Compressors.—There are two double-acting reciprocating



TWIN RETORT-HOUSE GOVERNORS AND FITTINGS.



INDEPENDENT HYDRAULIC MAINS AND PLATFORM.

gas-compressors, each capable of dealing with 30,000 c.ft. of gas per hour against a pressure of 10 lbs.

Gas-Engine and Emergency Set.—This consists of a 40 B.H.P. gas-engine and generator. The set was originally installed at the old works; and though it is not quite adaptable as to power to its new work, it forms a very useful emergency set in case of temporary failure of the steam supply. The drive from the gas-engine is through a countershaft, and arranged so that it will drive either exhauster as desired. A very steady vacuum chart is obtained by this method.

Gauges, Recorders, &c.—As far as possible, all gauges, recorders, &c., have been fixed in the power-house; so that they are constantly under the eye of the carbonizing foreman and the boiler and engine men.

Scrubber and Livesey Washer.—The scrubber is 10 ft. diameter and 60 ft. high, of 1,000,000 c.ft. per day capacity, and filled with wood boards. A liquor turbine is installed in the machinery-room on top of the scrubber, together with the usual distributor apparatus for spreading the liquor. In the base of the scrubber there is a Livesey washer, which is arranged with two outlet seal-pipes, so that it may be used either as a tar-extractor in the ordinary way, or as a tar-washer for the extraction of toluol from the gas.

Scrubber-Washer.—The scrubber-washer is of the Holmes improved pattern rotary type. It is of 1,000,000 c.ft. capacity, driven by means of a vertical steam-engine situated between the two sections of the machine; and the drive is through a flexible coupling and worm gear.

Purifiers and House.—This house is 125 ft. long by 50 ft. wide. It is covered with a Belfast roof supported by a steel structure. There are four lutéless purifiers, each 30 ft. × 30 ft. × 5 ft. deep, and arranged in line forming one box 120 ft. long × 20 ft. wide. Each purifier has two covers; and these have the usual rubber jointing. The purifiers are fitted with Spencer's hurdle grids. The cover-lifting apparatus consists of a hand-operated Goliath crane, which runs on rails cast on the top purifier plates. The purifiers are fitted with separate inlet and outlet valves of the Holmes double-faced "Western" type.

Underground Tar and Liquor Tank.—This tank is constructed of cast-iron plates built-up to form a tank 30 ft. × 15 ft. × 8 ft. deep, and having a plate to divide it into two compartments. The top is of reinforced concrete, with suitable manholes to give access to the tank.

Overhead Tar and Liquor Tank.—This tank is constructed of cast-iron plates built-up to form a tank 28 ft. × 16 ft. × 5 ft. deep, having a division plate placed two-thirds from one end. It is supported on a steel structure, and is covered with tongued and grooved boarding and tarred felt.

Pumps.—There are two Evans vertical Cornish direct-acting pumps, each having 3-in. connections, so arranged that either pump can be used for circulating the liquor round the scrubber, or for pumping tar and liquor to the overhead tank, or liquor to the sulphate plant, which is on the old works.

Rotary Meter.—The Thorp rotary meter is capable of passing 50,000 c.ft. of gas per hour, and is at present housed in a temporary construction, pending the future building of a new laboratory and meter-house.

High-Pressure Supply to Slaithwaite.—The Slaithwaite holders are supplied with gas direct from the Longwood new works. The holders are filled-up at stated times under high pressure, from the reciprocating compressors, through a 6 in. steel main. The 6-in. high-pressure steel main is 5340 yards long, with socket joints acetylene welded. It is divided into five sections by Donkin high-pressure gas-valves. Seven syphons were necessary, on account of the varying altitude. At the lowest point midway between Longwood and Slaithwaite a duplicate set of Reynolds 2½ in. district governors is fixed, to boost the existing 6 in. low-pressure main. There is also in the same governor-pit one 6-in. Donkin combined high and low pressure valve, for augmenting the pressure in the 6-in. low-pressure main when the compressor is not working. The governor-house at Slaithwaite contains a duplicate set of 6-in. Reynolds governors for an outlet pressure of 6-in. water-gauge, and connected to a 12-in. holder valve at the inlet of the holder (both by Donkin), which is automatically closed when the holder is full. The steel main was tested to 100 lbs. per sq. in. pressure, and found quite sound. Not a single length of main had to be cut out or a single joint re-made.

The whole of the gas lighting installation and plumbing work was done by the Company's own workmen. Owing to the war, certain work has been unavoidably left over.

DEMPSTER-TOOGOOD CONTINUOUS VERTICAL SYSTEM.

Description of the New Carbonizing Installation at Longwood.

IN connection with the formal opening which took place last Thursday, as recorded above, of the new gas-works of the Longwood and Slaithwaite Gas Company—of which Mr. J. H. Brearley is the Engineer—the following description was prepared by Messrs. Robert Dempster & Sons, Ltd., of Elland, of the installation of the Dempster-Toogood system of continuous vertical retort carbonization. The contract was given out in February, 1915. Messrs. Dempster & Sons commenced work on the site the following June; and gas making was achieved in December, 1916. The complete works have thus been built under all the disadvantages of war conditions.

The new site of 3 acres is adjacent to the old Longwood works; being separated only by the main public road and a brook. The characteristic features presented by the site are: The main line of the London and North Western Railway is carried along one side of the site on a monumental stone viaduct, 65 ft. high; yet no siding to the site was financially practicable. The site falls some 20 ft. towards the brook; and a public road is situate at both the high and low levels. The district coal sidings (the railway being above the valley) are at the high-level end. Hence, naturally, the coal arrives by carts at the high-level road. The low-level main road better serves the district. Hence it is the more suitable for coke distribution and general gas-works services. Therefore, the site containing no complications to tie the hands of the Engineer, peculiar interest attaches, not only to the type of plant installed, but to the cohesion, or method of application for the best utilization of the essentials of the site.

Carbonization.—This, the most important factor of gas manufacture, in a broad sense and as a working whole, embraces everything from the receipt of the coal to the delivery of the residual coke. To accomplish the desired ends, the carbonizing plant is arranged in one continuous line, 400 ft. long; the coal arriving at the high-level, being tipped from the elevated position in the cheapest manner possible, and without the aid of machinery. The thrust of coal in the store is taken by the earthwork of the cutting. The residual coke arrives at the other end for distributing, *viâ* the low-level roadway to the district.

Coal Handling.—A gravity bucket conveyor circumscribes the breaker-pit, the coal-store, the retort-house, and the coke screening and storing plant; the lower strand receiving material, and the top strand delivering material, at any desired point throughout its length. Thus, whenever coal arrives, it is broken and sent (1) direct to storage hoppers, 48 hours' capacity, 200 tons untrimmed; (2) direct to the coal-store, 10 days' supply, 1000 tons untrimmed; (3) the lower strand automatically, and without expenditure of extra labour, replenishes the hoppers from the store, hence the 1000 tons of coal in stock is on tap for gasmaking. Railway arches are used for supplementary coal storage.

Coke Handling.—The residual coke, having equal bulk with the original coal, should, for similar economy of working, have equivalent facilities of handling. This is accomplished by the same gravity bucket conveyor, as by means of a travelling feed and filler the coke is gently handled (1) direct from the retorts to coke-storage hoppers over the retorts and furnaces, of 50 tons capacity, or (2) direct from the retorts to the coke screening plant, of 57 tons capacity.

Coal Breaking and Handling Plant, 40 Tons per Hour.—The coal arriving at the works for current use is dumped into an underground receiving hopper. From the hopper, the coal is extracted by a reciprocating tray, which regulates the rate of flow regardless of the grade of coal, thereby preventing chokes. From the extractor, the coal passes over a screen, the lumps going to a four-roll breaker of massive construction. The breaker is belt-driven; so that the belt slips should the breaker be jambed with foreign material inadvertently delivered among the coal. The nuts and slack bye-pass the breaker. The whole coal thus prepared enters a rotary filler, the function of which is to load each bucket axially, so as to gravitate plumb without spilling. The loaded buckets are discharged at desired points by cams fixed to the framework in the usual manner.

Gravity Bucket Conveyor.—This contains 272 buckets at 2 ft. pitch. The chain links are 2 ft. centres of hinge-pins—viz., twice the normal length. Thus the knuckle-joints are halved in number, with consequent reduction in wear and tear and stretch of chain; and it facilitates lubrication. Each link is fitted with hardened steel renewable bushes; and the knuckle-joints are automatically lubricated. To overcome the pulsating strains being transmitted to the chains by the hexagonal driving sprockets (Dempster and Toogood's patent), eccentric spur-gearing pinions are employed, which give to the links a very steady motion. The lower strand is provided with a travelling rotary feed and filler [Patent No. 102,535 of 1916]. This machine can be anchored by brake gear at any point to receive, regulate, and axially load coal or coke into each bucket without spilling or choking. The conveyor-trough is rendered self-cleaning by a special pushplate attached to the links, which deposits the material in a sump, from which it is easily and periodically removed.

Coal-Store.—This contains 1000 tons of broken coal. If trimming be resorted to, the capacity could readily be increased to 1250 tons. The coal is handled to and from the stores in a very automatic manner by the conveyor. The coal-store is partially cut into the hill side, whereby the thrust of coal is largely taken by the earthwork. The building is of steel structure 95 ft. long × 36 ft. span; the structure being filled with concrete blockwork, 4½ in. thick, offering a rock-faced exterior to harmonize with the general tone of the buildings in the locality, and a smooth interior. The floor of the store has been excavated to the general yard level, to facilitate general usefulness.

The lower strand of the gravity bucket conveyor throughout the length of the coal-store is covered with an archway of interesting construction. The roof consists of continuous slide-doors operated from the underside. The sides are formed of planks placed Venetian blind fashion. The heart of the coal in stock is thus always under observation; and the planks being readily removable, the maximum facilities are at hand for emptying every ton of coal in the most economical manner.

Retort-House.—This building presents a massive stone exterior, though similarly constructed to the coal-store. Its dimensions are 90 ft. long × 36 ft. span × 75 ft. total height. The roofs are slated, except for the portion adjacent to the bench top, which is wholly glazed and provided with hinged portions, whereby the bench top is well lighted and ventilated.

Foundations.—The subsoils were of good character, though, being at a rapid inclination towards the river, caution was necessary for so important a structure. Accordingly, a ferro-concrete raft was introduced under the bench, to spread the superincumbent weight, so that the subsoil is not loaded to a greater extent than 2 tons per super foot.

GENERATOR HOUSE, SHOWING GAS COMPRESSORS AND EXHAUSTERS.

Vertical Retort Installation—Dempster-Toogood Process.

The characteristic dominating the design of this system is the balanced independence of each retort or unit.

Bench.—The bench contains twenty retorts, of a total capacity of 1,250,000 c.ft. per diem. The retorts are grouped in five beds. Each bed is heated by a stepped producer of large grate area. Each producer is provided with a controlled stream of pre-heated, saturated primary air, and has an independent chimney. Advantage is taken of the elevated position of the ashpan to furnish at each ashpan a storage hopper, so that the ashes raked from the ashpan are stored, pending periodic removal at ground level. The producer burns at a constant depth of fuel, thus facilitating the maintenance of a uniform quantity and quality of producer gas. The producer gas flue from the furnace is formed as a "whirl," whereby mechanically suspended flue dust particles are precipitated, before entering the combustion chambers. Thus their fluxing proclivities are prevented. The producer gas enters the setting by twin flues, such that either one can be damped-off and two retorts worked independently.

Bench Bracing.—The bench is very rigidly braced by plate girders, lying horizontally and stiffened by vertical handrails, thereby forming walking-ways surrounding the bench.

Staircase.—A steel staircase gives access to all levels, and extends in easy flights from the ground level to the top strand of the conveyor, 70 ft. above the ground, so that the greatest facility exists for supervision.

Retorts.—Each retort is built-up, together with its flues, from grooved and tongued bricks of highly refractory material, to an accelerated taper, in accordance with Patent No. 16,471 of 1912. The total height is 25 ft., and the maximum section 5 ft. × 1 ft. 8 in. In action, each retort contains 2 tons of material under distillation. In fact, these retorts possess the throughput of a coke-oven; yet the charge is never handled in bulk. Each retort is a unit of heating, and is controlled by one damper; the method of heating being the ignition of producer gas in eight flues at one level situate some distance from the top of the retort. The flames of combustion, being shaped by annular burners, burn downwards in vertical flues. Thus impinging and cutting actions are totally obviated. Further, the vertical flues having no floors in the combustion zone, the dust particles fall freely to the cooler parts of the setting. Their tendencies to flux are thus rendered dormant. The products of combustion in the eight flues travel downwards, giving off their heat to the charge in a perfectly systematic manner; and at the base the whole of the low-temperature products collect, and rise to co-mingle round the top of the retort, to regenerate on the incoming cold coal, and to heat efficiently the twin free spaces above the cap of the charge wherein the vapours are selectively cracked into gas.

Retort-House Governors.—These are grouped on the bench top, where they can be readily seen and attended to. They are in duplicate of 8 in. size, so that one spares the other. Each stands on a seal-pot, so that sediment can be removed; and the whole installation is fitted with gauges, thermometers, &c.

Behaviour of the Charge in the Retort.—Each cross-section expands on heating; but as the motion downwards is continuous, each horizontal cross-section of the charge meets an ever-increasing cross sectional area of the retort in order to accommodate, and in proportion to, such expansion, without giving undue thrust. In this system, this increase in area is maintained throughout the whole retort and cooling chamber in [accordance with Patent No. 17,616, of 1912], until, in fact, the maximum cross-section of the charge rests on the moving coke-extractor gear. Thus, at the bottom, the cooling coke contracts, fissures form naturally, and the heat is better conducted to the cooling mediums. The cooling chamber is of tubular construction; the lower two tubes (to absorb the low temperature) being of iron.

The whole of the primary air and water vapour for the furnace circulates in the lowest tube. The secondary air, controlled for each side of each retort by extra fine slit adjustable slides, is heated in the upper tubes by the spent coke of its particular retort, and rises direct to its allotted place at the burners. There being no regenerators in the ordinarily accepted sense, there is no risk of short-circuiting. The outcome of this patented method is a straightforward setting, easy of understanding, and easy of control.

Gas Egress from the Charge.—To start the charge on its way in the best manner possible, the coal enters on the centre of the major axis. The larger pieces gravitate to each side, establishing at the outset a balanced condition of the charge, and forming

two free spaces, so that the evolved gas rises with equal resistance through each half of the retort. Coal and coke are admitted to the retort through a gas-tight coal-valve, the faces of which are vertical, and the plug of which is completely rotative. Hence the faces are all self-cleaning. Each retort is provided with its own hydraulic main and appurtenances; so the carbonizer can work each retort independently, according as experience dictates.

Cooled Bench Top.—The top retort mountings are grouped right and left hand, so as to form a large clear working space on each bed. The bench is paved with tubular fire-brick, and the chimneys lagged with vented asbestos. An induced current of air traverses the whole, so that the stoker, having relatively greater space of movement, has freedom which conduces to efficient working.

Liquor Circulating.—High and low level tanks are provided. A small steam-pump, running very slowly, keeps the top tank replenished. The liquor gravitates back through all the mains to the lower tank, so that any crystals are immediately dissolved before they can become protected with a coat of tar. This is one reason for the remarkable freedom from chokes. The surplus liquor and tar overflow from the lower tank to the well.

Condensers.—There are five atmospheric annular condensers, 30 ft. high, 48 in. external diameter, and 39 in. internal diameter, and one water-tube condenser of similar external dimensions, fitted with 63 tubes. The condensates are removed by 4 in. branches and a 6 in. main terminating in a seal-pot. There are 18 in. bye-pass and rack-valves fitted, for bye-passing as and when required.

Cooled Coke-Extractor Gear.—The most important function of continuous carbonization is the removal of the coke in such a manner that the charge moves downwards uniformly over the whole cross-section of the charge. In this system, it is interesting to note, the design contains no claws, arms, or worms, but instead the friction engendered by the force of gravity alone is utilized. In this way: (1) Breakage of coke is reduced to the minimum; (2) every conceivable horizontal cross-section of the charge in turn descends through an ever-tapering retort to be uniformly extracted by the mechanism; (3) the two-fold motion imparted to the extractor absolutely overcomes the tendency of the coke to bridge or hang-up.

The extractor consists simply of an inclined tray, on which the cooled coke rests at the natural angle of repose for coke. Slow reciprocating motion is imparted, so that in one direction the coke rolls gently down the angle of repose, and in the reverse direction the charge gravitates bodily and uniformly down the retort to fill the vacant space formed. The slight agitation of the reciprocation prevents all bridging of the coke.

The extracted coke is collected in receptacles, which are discharged to the conveyor at two-hour periods. Each receptacle is fitted with a controlled steam supply for the double purpose of (1) damping any sudden contact of gas and air on the opening of the self-sealing lids, and (2) permitting a percentage of blue water gas to be economically made by steaming the charge to a desirable extent.

Adjustable Drive to Extractors.—The extractors are driven by absolutely silent friction ratchets, and are capable of the widest possible and independent adjustment for each retort. All adjustments can be made without stopping; the normal working being a 4½ in. stroke of tray in 4½ minutes.

Coke Screening and Storage Plant.—With continuous vertical retorts—the buildings being of necessity high—there is a surfeit of height at disposal in the design of a coke-screening and storage plant. This feature, peculiar to vertical carbonization, has been fully developed at Longwood to give (1) large storage hoppers above and below the screens, (2) to adopt superimposed rotary screens at the best inclination, and (3) to give extra cartage room for the accommodation of modern motor vehicles.

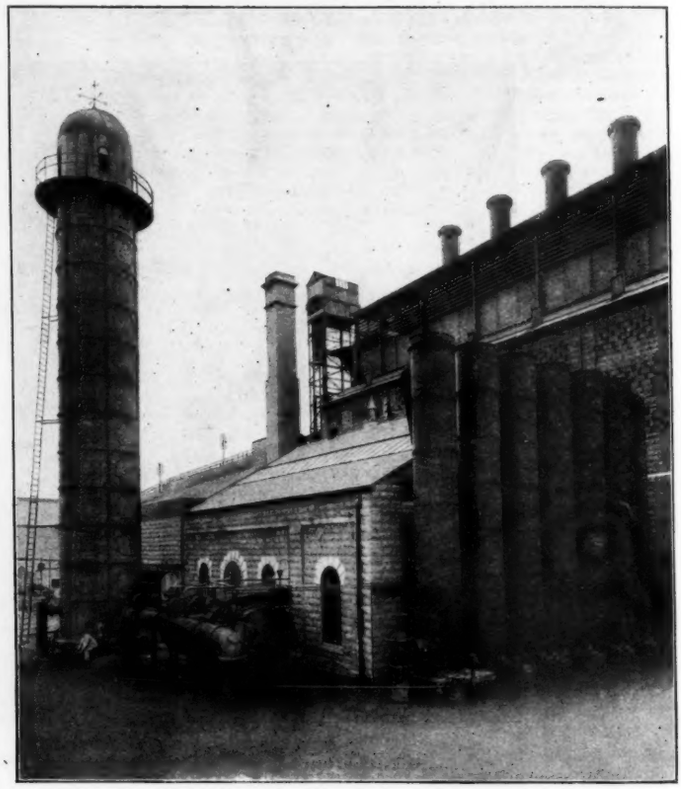
The coke arrives direct from the retorts (*viâ* the gravity bucket conveyor or hoist) at a height of 70 ft. above the ground, and is delivered to a receiving hopper built as an inclined silo, so as to reduce breakage of coke to the minimum. Its capacity is 10 tons. Hence it acts as a reservoir of unscreened coke, thereby saving the necessity of running the screening plant during periods of stoking—facilitating the disposition of labour. Beneath the silo is fixed reciprocating extractor gear, which delivers the coke either to the coke-cutter for reduction in size, or direct to the screens (in a regulated quantity), whereby chokes are prevented and better screening ensured.

Continuous vertical retort coke being relatively dry, rotary screens are very suitable; and there being no embargo on head-room, two superimposed screens are permissible. The maximum percentage—viz., the large coke—is taken out at the first operation by one screen; only the tailings of lesser bulk passing through the other screen, by which means more efficient screening and less wear and tear are established. Beneath the screens, storage hoppers containing 15 tons of large coke, 10 tons of small coke, 12 tons of smithy coke, and 10 tons of broken coke are grouped—sufficient head-room being left for the ready use of modern heavy motor vehicles. In this way, the combined storage capacity is 57 tons, representing a 24 hours' winter sale, or a 48 hours' summer-time sale—a capacity commanding convenience of working with efficiency of yard labour.

Auxiliary Handling and Yard Storage Plant.—To act as a spare plant to the gravity bucket conveyor, give ready access to all parts (additionally to the main staircase), and provide means for economically dealing with the surplus coke in the yard, a high-speed electric hoist, a special ball-bearing truck, and necessary gantries are provided. The hoist is capable of raising two tons at 100 ft. per minute, and follows the generally accepted lines of electric hoist construction. It is fitted with the usual complement of safety devices and safeguards. The cage is commodious, being 9 ft. × 7 ft. 6 in. × 7 ft. 6 in. high, and is fitted with automatic grip catches to arrest and lock the truck within the cage.

The hoist structure is 88 ft. high, and exit levels and safety gates are situate: At ground level, giving access to retort-house and coke stack; at heights of 15 ft. 6 in., giving access to the clinker floor and yard gantries; at 38 ft., giving access to the bench top and screening plant; and at 63 ft. above ground, giving access to the coal-storage hoppers and the silo over the coke-screening plant.

The truck is mounted on ball-bearings, and is surprisingly easy of manipulation. It contains approximately one ton of coke; and as one man could not tip such a load in the orthodox manner, side discharge doors are fitted, locked and manipulated by Dempster's single-pull lever gear from either end of the truck. The gross load of the coke and truck is some 38 cwt.; and as the full truck passes always in one direction, the several gantries are slightly inclined, so that the full truck practically gravitates to the discharging positions.



TOWER SCRUBBER, ROTARY SCRUBBER-WASHER, CONDENSERS, &c.

To enable the attendant to manipulate such a heavy load to and from the cage, it is necessary that the rails should be in exact alignment. To get the desired exactitude without a series of trials and starting and stopping of motors, all landings are fitted with a trip gear of Dempster's design, such that the rails are always held in alignment even should the hoist cage come to rest at any position within a margin of 3 in. of its correct position. Thus the stoker's work is simplified and wear and tear reduced.

The yard gantry is 160 ft. long and 15 ft. 6 in. high; consequently 500 tons of coke can with ease and dispatch be taken to the yard and stored without excessive breakage. Inclined rails are laid beneath the gantry at yard level, so as to facilitate bringing coke from the yard to the screening plant *viâ* the hoist. An inclined gantry is arranged under the retorts and over the storage hoppers; thus permitting coke to be handled *viâ* the hoist direct from the retorts to the storage hoppers and coke-screening plant.

The hoist is kept 10 ft. from the retort-house, and a 9-ft. cartway is left between the boiler chimney and the hoist. This is by design; so that, when the yard is complete, a 2-ft. gauge track will be laid through to the coal-stores and into the yard, and connected to the hoist—thus permitting coal to be handled from the store *viâ* the

hoist, and ashes from the ash-pan *viâ* the hoist, and, if the need arises, to stack and handle hundreds of tons of coal to and from a stack in the yard in an economical manner.

Power-House, Boiler-House, and Mess-Room.—The buildings are of 9 in. concrete block work; the exterior representing a stone façade, such that the buildings harmonize with the locality. The roofs of the power-house and mess room are boarded and slated, and provided with a glazed sky-light. The boiler-house roof is formed by a cast-iron tank, 40 ft. × 23 × 3 ft. deep, supported on rolled steel joists, and containing the feed water and condensing batteries for the exhaust steam. The interior of the power-house and mess-room is neatly plastered and tiled, to give a light, airy, and pleasing appearance.

Generating Plant.—This consists of two 50 H.P. 600 R.P.M. duplicate direct-coupled vertical steam-driven electric generator sets; steam being supplied at 100 lbs. pressure. The generators each develop 33 KW. at 220 volts direct current. The switchboard is of enamelled slate, and is arranged so that the generator may be run in parallel if desired. The switchboard is prepared for five circuits—viz.: For the 20-H.P. motor driving the coal-breaker; the 20-H.P. motor driving the gravity-bucket conveyor; the 12-H.P. motor driving the coke-screens; the 12-H.P. motor driving the hoist; and the 6-H.P. motor driving the coke-extracting mechanism. Thus there are three sizes—two of each size of machine—thereby facilitating stand-by in emergency and reducing the stock of spares necessary for maintenance.

The exhaust steam from the engines is collected in cast-iron piping beneath the floor; a battery of pipes being formed in the feed-water tank, so as to condense the steam as much as possible, which condensation, in conjunction with the oil separator, recovers much of the oil from the steam for general lubrication purposes. In addition to the electric power, a small gas-engine is installed as a spare to drive the coke-extractor mechanism; so that, even should the steam supply or electric current totally fail, gas making can continue uninterruptedly till all the coal is used from the 48 hours' storage hoppers over the retorts.

Ferro-Concrete Bridge.—To give entrance to the works from the low-level road for the general use and cartage of coke, a ferro-concrete bridge, 34 ft. long and 20 ft. wide, has been installed. This bridge harmonizes with the local stone, and gives the readiest access between the district and gas-works for vehicular traffic.

Drying and Smoking Meat by Gas.

The fruit and vegetable preservation campaign now being conducted under the auspices of the National Commercial Gas Association of the United States has already been noticed; and further attention is drawn to the subject in a recent issue of the "American Gas Engineering Journal" by Mr. Gilbert C. Shadwell, who describes the important part played by gas in the canning, drying, dehydrating, desiccating, chemical preservation, cooking, heating, smoking, refrigerating, extracting, and concentrating of foodstuffs. In this connection, one of the first things to be remembered is that at 212° Fahr. all living cells perish; but some bacteria spores may survive for as long as two or even three hours. Still, few fully developed bacteria can live beyond 165° Fahr. when in the damp or liquid state, or beyond 280° to 290° Fahr. when in dry heat. As to the drying and smoking of meats, a smoke-house is illustrated which is so designed that the smoke may be sent through the meats or deflected into the flue at will, so that food may be left hanging without getting more smoke than necessary; and no smoke escapes into the room when the door is opened. The method of operating the smoke-shutters to secure this, is ingenious. The smoke-generating compartment contains the necessary sawdust pan and the gas-burners—the latter so designed as to give no smoke with a high heat, a heavy smoke with a low heat, or any stage between these two extremes. This is accomplished by having four burners; two under the pan and two at the sides. It is remarked that cured meats, after being soaked to remove surplus salt, should hang several hours. Then the smoke-house should be warmed to about 115° Fahr., so as to dry the surface of the meats. For this purpose the outer burners may be used, as they do not heat the sawdust pan. When thorough drying is accomplished, the burners under the sawdust pan [hardwood sawdust being used] should be lighted, and the temperature be allowed to rise gradually to 118° Fahr. in ten or twelve hours. The meats should be allowed to cool-off with the ventilator open before removal from the house. Of course, varying treatment is required for some meats.

"The Trade of To-morrow."—This is the title of a small book by Mr. Ernest J. P. Benn, receipt of a copy of which we have to acknowledge. The publishers are Messrs. Jarrold & Sons, Ltd.; and the price is 2s. 6d. net. It deals with a subject to which the author (as he has previously shown, in a book issued some time ago) has devoted a great deal of thought and study. In the introductory chapter, there is outlined a system of statutory Trade Councils working under a Minister of Commerce, which seems to Mr. Benn to offer a solution of most of our industrial problems; and after indicating the need for these bodies, and pointing out a few of the many fields which are open to their activities, he sets out the recommendations in greater detail. The claims which the author makes for the scheme—in principle, at any rate—entitle it to consideration. To quote only one of these claims, the scheme "puts the politician, the official, and the business man each in his proper sphere."

FUEL ECONOMY.

By E. W. SMITH, of Birmingham.

[Earlier this year, there was a discussion before the Birmingham Section of the Institution of Electrical Engineers on the subject of "Low-Temperature Carbonization." Mr. Drummond Paton and Mr. Frith, both of Manchester, presented papers; and Mr. E. W. Smith, the Chief Chemist to the Birmingham Corporation Gas Department, was asked to contribute to the discussion, and furnish matter for publication. The Institution have now decided not to publish the papers or the discussion; but "JOURNAL" readers will be interested in Mr. Smith's remarks, which he has been good enough to forward. In reproducing them, it may be stated that the discussion at the meeting referred to went very strongly against the use of raw fuel for the production of electricity.]

As regards low-temperature carbonization, I have an entirely open mind. I can see many objections to it as compared with present methods, and so far few advantages if it is proposed to displace the present methods of carbonization by the new ones. One is impressed by the enthusiasm of Mr. Drummond Paton on the subject of his paper; and his hearers admire his boldness in coming before a Society of an industry which is one of the greatest delinquents in the wastage of coal. There has been much talk during recent times on this all-important subject; and while two Professors [Bone and Armstrong] have been talking, the men with sound practical experience have been working. This work, however, must be more general.

One cannot understand why Mr. Paton and his friends still cling to the use of solid fuel for domestic purposes. Surely they must recognize that, taking everything into account, gaseous fuel has proved the most efficient. The wish to centralize power stations near the pits, and so reduce freight, appears to be largely a delusion—a snare. When applied in conjunction with the process of low-temperature carbonization, the solid fuel produced will amount to over 75 p.ct. of the original coal. It will occupy a space more than that of the original coal; and wagon hire will be increased correspondingly. It is surely wasteful to leave in the solid residue at least 10 p.ct. of volatile matter, or between 30 and 40 p.ct. of what was originally available in the coal.

Great claims are made for the yields of tar; but while the speculator may be satisfied with the increased yields shown, the technologist and engineer require figures indicating the constitution of these tars, as compared with coal tar, and their commercial value after full trials. The process of low temperature is, however, wasteful in gaseous fuel and ammonia. About 5500 c.ft. of gas is obtained, of a total heating value of 750 B.Th.U. per cubic foot, or an available quantity of heat in the form of gaseous fuel of 4,125,000 B.Th.U. per ton of coal. Gas-works practice (high-temperature carbonization) would give 12,000 c.ft. of gas of 550 B.Th.U. gross, or an available quantity of heat in the form of gaseous fuel of 6,600,000 B.Th.U.—an increase of 60 p.ct. The suggestion that the rich gas might be diluted with (say) blue water gas is not a very practicable one, and would certainly not cost any less, unless the gas were evaluated according to coke-oven methods. From low-temperature carbonization the yield of ammonia per ton of coal corresponds to 20 lbs. of sulphate, as compared with 28 lbs. from gas-works practice; and if the coke be gasified in Mond producers, a further yield of 33 lbs. may easily be obtained, or a total of 61 lbs. from the original coal, as compared with 20 lbs.

The volume of town gas sold in Birmingham for the year ended Dec. 31, 1916, amounted to 10,733,000,000 c.ft., of which 14 p.ct. was used in gas-engines, 19 p.ct. for industrial heating, and about 27 p.ct. for gas fires and cookers; giving a total of over 60 p.ct. for heating and power purposes. This total gas corresponds to about 720,000 tons of coal, from which, besides the gas, there has been obtained about 9 million gallons of tar, 475,000 tons of coke, which is used for boilers, furnaces, and metallurgical purposes, besides the large quantities employed in the production of water gas and producer gas from which bye-products are obtained.

Do not think from what I have said that I wish to give the impression that there is no room for electricity. Gas-works are large users of electricity. In the Birmingham Gas-Works we use over 200,000 units per month, most of which is generated on our own works at a substantially lower cost than we can buy it. As an industry, we are proud to think that, in principle, our methods for the utilization of coal have so far proved the most efficient. Not only are we the purveyors of energy, but our works are also chemical works on a large scale. I am of opinion that too much can be made of the idea of the centralization of power production. I believe it is generally felt that when a gas-works has reached a capacity of 20 millions a day, it is better not to extend further, but to build new works—the mains being interconnected.

Illuminating Engineering Society of America.—In connection with the "Correspondence Convention" of the Society (which, as already announced, it is intended to hold this year in place of the usual annual convention), a tentative programme has now been arranged. This includes the Presidential Address of Mr. W. J. Serrill. The idea is to arrange the papers in groups, and to invite written discussion from those who apply for copies. The papers may also later on be utilized for sectional meetings.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Visit to the Longwood Gas-Works.

The formal opening of the new works of the Longwood and Slaithwaite Gas Company, near Huddersfield, last Thursday, in the presence of a large gathering of senior gas engineers, was followed, on Saturday afternoon, by a visit of the members of the Yorkshire Junior Gas Association, under the presidency of Mr. J. E. Lister Cooper.

The weather was brilliantly fine, and the visitors were able to inspect the various installations (described here and elsewhere in the "Journal") in every comfort.

The guests were received by Mr. J. H. Brearley, the Engineer and Manager of the Company, on behalf of the Directors. Mr. Brearley said he was glad to welcome the Juniors to Longwood. It was about the third time the Association had asked to be allowed to see the reconstruction of plant; but he had felt that if they had come during the process of erection, they would have found the place in a dreadful state. The Company had, therefore, thought it better to have the works in something like a more finished condition before receiving visitors. It was about fourteen years since last the Yorkshire Juniors went round the Longwood works; and then it was not as an Association, but rather as students of Mr. Cranfield, who was, they might all agree, practically the father of the Association. He (Mr. Brearley) believed it was in the very board room in which they were now met that the seeds of the Yorkshire Junior Association were planted, when he had suggested that it would be a good thing if an association of the juniors could be formed. The suggestion had been taken up very heartily by the students; and he believed that was the birth of the Association. He had always taken a keen interest in the doings of the Association. Many of those present might recollect an occasion on which he had read before the Association a paper on "Naphthalene." This paper had been read from the point of view of a man who had had practically no previous experience of the trouble. In all his seven or eight years with the Company previous to the delivery of that paper he had seen no naphthalene on the works. He had seen plenty since, especially since the war. The Company were hoping that the installation of vertical retorts would cause all this trouble to disappear.

The guests were then divided into separate parties, under the guidance of Mr. Brearley, Mr. H. J. Toogood (of Messrs. Robert Dempster & Sons, Ltd., the Contractors for the vertical installation), Mr. M. T. Thompson (of Messrs. Drakes, Ltd, the Contractors for various other parts of the plant), Mr. T. Dyson, Mr. R. H. Duxbury, Mr. Brearley's works assistant, and Mr. E. L. Ongleton, the Company's Sales Manager.

Tea, and Some Speeches.

After an interesting tour of the whole of the new plant, the visitors were entertained to a substantial tea in the well-equipped rooms of the Armitage Lodge.

The President of the Association, in moving a hearty vote of thanks to the Directors of the Company, to Mr. Brearley, and to the gentlemen who had acted as guides, remarked that the visit was the last of the session, and had been a most valuable one. The gas industry was fortunate in having such progressive men as Mr. Brearley in its ranks; and it was well for the industry that a plant like that at Longwood could be put up and completed under all the difficulties of the present time. He believed all members present must, in the course of the inspection of the works, have learned much of value to themselves in their own particular departments of the industry. The plant was remarkably well thought-out, both in general and in detail. The Association were very fortunate in being able to count upon the support and ready help of Mr. Brearley and other gentlemen of his standing, and might look forward to great possibilities in the near future. The Junior Gas Associations of the country were embarking upon the collection of retort-house data; and no doubt the Yorkshire Association would be asking Mr. Brearley for facilities for the collection of data from his plant. Needless to say, they looked forward with confidence to securing valuable help in their work.

Mr. A. Edwards (Leeds), in seconding the proposition, said it had often struck him that they learned most really from visits to the smaller works rather than to those large concerns in which a multiplicity of things are to be found. The plant they had seen that day was neat in every way.

Mr. Ed. Garsed (the Vice-President), supporting the motion, said reference had been made to the most obliging assistance and ready help which had always been forthcoming from Mr. Brearley. Another thing which had struck him in going round the works had been the frankness of explanation and confession of troubles. Had there been more time, he felt they could have occupied the whole day in asking questions and getting candid and informative replies. He mentioned this frankness particularly, because it was pretty well known that up to recently the question of vertical retort carbonization had been rather shrouded, and the difficulties met with had been somewhat kept under. He thought some greater frankness would be the means of getting over many of these difficulties and making into an established fact the vertical retort carbonization idea. When one got into a bit of a fix with verticals—and especially in this hot weather, when one had to spend hours in the pitch and tar—one was inclined to complain; but he was convinced that it was by frankness and openness one to another that the difficulties met with in each individual plant could be minimized, and the rough paths made smooth. This frankness would be most essential to the successful collection of data.

Mr. Brearley, in responding, expressed his appreciation of the presence of the Association. It was always a delight to him to help forward the work of technical associations; and although there might be men who were able to help the Junior Associations more capably and heartily than he, he could assure the gathering that none could help with greater sincerity. It was, as he had previously remarked, fourteen years since the Association was formed. The other day he came across a letter from the Association's first Secretary, Mr. Fred Schofield, dated May 15, 1903, intimating the successful establishment of the Association, and enclosing a copy of the proposed rules. Later, in November of the same year, he got another letter to say, "We are electing a number of honorary members, and, of course, you are included in the list." These two letters he prized very much. Some of his own junior officials had joined the newly-formed Association, and to-day they had a good many of his officials, whom he appreciated and prized very highly indeed. He hoped the time would never come when he was not prepared to do all he could to further the Association in its work. He must apologize for not having attended the Association's proceedings as often as he would like. Honestly, he was not greatly fond of attending technical gatherings at the week-end after a week's hard work. He was glad Mr. Cooper, Mr. Edwardes, and Mr. Garsed had been able to join the company that day. They were gentlemen who were a credit to the Association. He could assure all present that if there was anything anybody had not got to know that day concerning the Longwood works which he might like to know, all he had to do was to call and look round any day. He need not wait for a formal invitation. Coming from the general to the particular, he understood they were going to compile some data with regard to retort-house practice." So far as he himself was concerned, he would not have much to say about verticals until he had worked them for at least two years. He thought it was a great mistake to rush into print eulogizing or condemning any system before it had been properly tested in the furnace of practice. When he considered the time was opportune, the Yorkshire Association would get to know what he thought of the vertical system. He quite agreed with Mr. Garsed in regard to some things having been kept in the background. Difficulties were always made to be overcome. They at Longwood had had many difficulties already; but they were being reduced to a considerable degree. The difficulty of the hanging-up of verticals was one. But he believed they had now got over it. He thought the solution was largely one of coal selection; but more still one of the men on the work and those who were in charge of the men having a thorough understanding of the proper adjustment of the mechanism operating the retorts. One point which he was not yet quite satisfied about was as to the fuel consumption; but he believed they would be able to arrive at a fuel figure quite as satisfactory as any figure from horizontals. They could not jump into perfection in a week or a month with a new system. If they changed their methods, they had to begin to learn gas engineering over again. There was no comparison between the duties of the men or the supervision when they changed-over from hand-charged horizontals to mechanically charged vertical retorts. He felt that the Longwood Company were entitled to great congratulations on having been able to finish the work during the war conditions. The contractors had faced their undertaking nobly, and great credit was due to them all. They had given the Company an installation which was second to none of its particular type. He was quite confident, from the independent views they had had on Thursday, when the members of the Senior Association were present, and from his own experience up to date, that the Company had got works which were going to be very successful. They had, of course, met difficulties, particularly of a physical nature as well as mechanical; but they were all there to be overcome. Such paragraphs as had recently appeared in one journal, to the effect that vertical installations were failures, &c., were merely "twaddle," and must be written by someone who had never tried them. He took the vote of thanks as a compliment, not so much to himself, as to Mr. Ongleton, a member of the Association's own Council, and the other members of his staff. He was a firm believer in the policy of letting his departmental officials have their own share of responsibility, and giving them every scope to exercise their own discretion and intelligence. He tried not to interfere in their duties, though, of course, in the larger issues they consulted him. So far as the Sales Department was concerned, he left it very much in the hands of Mr. Ongleton. The vertical retort installation was left largely in the hands of Mr. Duxbury; and he could not sit down without adding his mead of praise to Mr. Dyson, who had been most self-sacrificing during these times of difficulty. His officials were a source of great comfort and help to him. In conclusion, he emphasized the invitation to the members to come over to Longwood at any time to get to know anything they thought they might learn further about the vertical retorts, or anything else in which the Company and their staff might be able to give any help.

Mr. H. J. Toogood (Messrs. Robert Dempster & Sons, Ltd,) said it had been a great personal pleasure to him to be present that afternoon; and he thanked Mr. Brearley for having invited him. During the war a lot had been said about difficulties. Truly they were great, especially eighteen months ago, when contractors were buying-up steel. It would be worse to-day, so far as buying steel was concerned, if they had the plant to start, though with the priority numbers, &c., work ought to proceed better than eighteen months ago, and in many ways did so. The action of the Government Departments to-day in relation to carbonizing left the gas industry rather unfairly treated. They saw all over the country their great competitor, electricity, putting down machinery with practically no difficulty. The electrical people were able to get priority numbers very readily; while gas undertakings could hardly get facilities even for necessary repairs. Wherever one went, one found the coke-oven plants getting preference. When the war was over the gas industry would have great competitors in the electric and coke-oven industries; and it was for associations such as theirs to keep a close watch on the welfare of their own industry.

Mr. M. T. Thompson (Messrs. Drakes Ltd.), having expressed his thanks for the invitation to be present, said the plant his firm had installed was of a kind with which most of the members were familiar, brought thoroughly up to date and fully modernized. Meetings such as they had had that afternoon were a great help to the industry, and they afforded an opportunity for contractors to meet the members of the profession and have a confidential chat.

VOLATILE PRODUCTS OF COAL CARBONIZATION.

Technical paper No. 140, issued by the United States Bureau of Mines, contains the suggestion that the use of inferior coal for the manufacture of illuminating gas might be found practicable, by utilizing low-temperature carbonization as an enriching process; a relatively large proportion of thin gas, such as blue water gas, being passed through the retorts and mixed with the light oil vapours.

A high-grade coal decomposes under heat, primarily into paraffin hydrocarbons, a completely altered non-volatile residue, and quite small quantities of water and carbon oxides which are first produced. Some other kinds of bituminous coal yield larger quantities of the oxygen compounds than gas coals; and such derivatives are of greater importance in industrial high-temperature carbonization, as also are the secondary reactions induced by the superheating of the hydrocarbons, than in low-temperature processes. The products of low-temperature carbonization of a coal of the Pittsburgh type, on an industrial scale, at 800° to 900° Fahr., are 1350 to 1560 c.ft. of rich gas, and 2 to 2½ cwt. of oil or tar, per ton of coal. The liquid consists of paraffins, with little or no benzene or naphthalene derivatives, and practically no free carbon. The gas will contain 6 to 7 p.ct. of unsaturated hydrocarbons, and 20 to 25 p.ct. of ethane and higher paraffins, and will therefore possess a high calorific and illuminating value. The tar may be subject to distillation or to cracking processes for the production of gasoline substitutes, of which it will yield at least double the quantity obtainable by high-temperature carbonization.

CARBONIZATION OF DUST AND SOOT.

[By a Dutch Correspondent.]

In a recent issue of "Het Gas," an account was given of some experiments made by Heer Alting, of the Amsterdam Eastern Gas-Works, with dust and soot as gas-producing materials. As in these critical times every grain of fuel has its value for gas-making purposes, the author had the idea of using refuse which might in ordinary times be regarded as valueless for the production of gas. The removal of the dust from the dust-catcher of the water-gas plant and the soot from the boiler-house flues is generally a problem, as nobody cares much to take them.

The aim was to mix the material with a sufficient quantity of coal tar, and to carbonize the resultant product in retorts temporarily out of action. The first trial was made with 50 kg. of water-gas dust, mixed with 15 kg. of raw tar. The mixture was carbonized for three hours at 1000° Celsius. The coke was valueless; being very soft, and easily reduced to powder. When the amount of tar was increased to 20 kg., there was obtained a coke of better quality, though still lacking in hardness. This was usable under steam-boilers. With 30 kg. of tar, the coke was hard and light grey in colour, being quite suitable for use as an ordinary fuel. When consumed in an open fire, it was found to last longer than ordinary gas coke and to give more heat; nothing but ashes being left in the grate. Further experiments with dust from other sources clearly showed that the amount of tar necessary to afford adequate binding, and resistance in the resultant coke, was at least 60 p.ct. of the weight of the dust.

As the intention was to remove as much valueless material as possible, the following experiments were made with the pitchy material from the hydraulic mains and the tar-separators. A mixture of 50 parts of water-gas dust and 30 parts of pitchy tar, carbonized for 3½ hours, produced 50 parts of small coke and 12½ parts of breeze. The coke was hard, light grey in colour, and was found to burn well. Not so hard, but otherwise of good quality, was the coke produced from a mixture of 25 parts of water-gas dust and the same amount of dust from the coal-gas plant. In this case, there were produced 47 parts of small coke and 18½ parts of breeze. In the same manner, there were treated dust from the roof of the water-gas plant, from the roof of the workshop, and from the flues of the boiler-house. This produced a coke which was very hard and dark grey in colour.

The result, therefore, is to show that mixtures of dust from various parts of a gas-works with 60 p.ct. of their weight of thick tar carbonized for 3 to 3½ hours at about 1000° Celsius gives coke that is usable as household fuel, and has the advantage of leaving only ash in the grate. The amount of ash, calculated as dry matter, of the different types of coke varied between 13 and 23 p.ct., the average being 15 p.ct. The point is whether this treatment of gas-works refuse is remunerative. A trial with about 10 metric tons of the mixture demonstrated that, when all charges had been taken into account, the cost price of the coke per ton was 8s. 11d.; the breeze being regarded as of no value. Thus, the proposal seems to be a practical method of utilizing the gas-works refuse referred to.

Examinations in Gas-Fitting.—The following employees of the Exeter Gas Company have been successful at the "Gas-Fitting" Examination lately held in that city: W. G. Lowton (Grade II.), J. A. Willmot (Final), A. Incledon (Final), and S. S. Adams (Final). Mr. Lowton has secured the second prize, Grade II. (bronze medal).

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Construction of Gas-Furnaces.

SIR,—May I take the opportunity of referring to the report printed in the "JOURNAL" of the 24th inst., concerning my remarks in connection with Mr. Walter's paper read before the Society of Chemical Industry at their annual meeting in Birmingham on the previous Thursday?

I am reported to have said that I had not seen a well-designed gas-furnace. This is incorrect. I inferred that I had not seen a perfect annealing furnace, but that there are some very promising examples.

To anneal metal in a neutral and absolutely non-oxidizing atmosphere is a great objective; and to do so with a furnace of simple and practical design would be the acme of scientific progress.

Annealing muffles or ovens of scientific design referred to by Mr. Smith are like a few other types of annealing furnaces "up to date." Speaking in general terms, however, the very large majority of annealing muffles at present in use in the steel and metal industries are of primitive design; and the scope for improvement towards scientific annealing is a subject which is engaging, and will continue to engage for a long time to come, the best brains of furnace designers.

E. P. TAUDEVIN.

23, *Leaside Avenue, Muswell Hill, N., July* 28, 1917.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 25.]

Nos. 10,240—10,525.

BAGNALL, R. I.—"Indicating depth of liquids in tanks, &c." No. 10,464.

BAILEY, T. H.—"Lamps or lanterns." No. 10,274.

BEARD, G. F. H.—"Gasholder crowns and crown framings." No. 10,502.

COOKE, G. F.—"Venturi or choke tubes." No. 10,322.

COOPER, T. L. R.—"Utilization of energy of gases of combustion and of waste or exhaust fluids, and motive-power means therefor." No. 10,308.

DEMPSTER, R. & J.—See Beard. No. 10,502.

DEMPSTER & SONS, R.—"Vertical retorts." No. 10,283.

DICKINSON, W. J.—See Cooper. No. 10,308.

DUNKLEY, W. H.—"Utilizing bodies of motor vehicles for storage of gas." No. 10,256.

FOSTER ENGINEERING COMPANY.—See Bagnall. No. 10,464.

FRAIS, S.—"Means for storing gases under pressure." No. 10,393.

GREIG, A. C.—"Bunsen burner for lighting and heating." No. 10,282.

GROSSMANN, J.—"Method for obtainment of nitre-cake in a disintegrated or ground form." No. 10,286.

HEINZ, E. J.—"Manfacturing coke." No. 10,411.

HEYL, G. E.—"Means for improving the distillate from sulphur-containing coal or shale." No. 10,433.

HEYL, G. E.—"Means for effecting agglomeration of spent residue from distillation of coal and shale into briquettes for combustion." No. 10,434.

LYON, A. A.—See Cooper. No. 10,308.

STARK, A. H.—See Cooper. No. 10,308.

THEISEN, H. E.—"Gas purifiers and coolers." No. 10,450.

TOOGOOD, H. J.—See Dempster & Sons. No. 10,283.

APPLICATION FOR RESTORATION OF LAPSED PATENT.

Notice is given that WILLIAM BROWN DAVIDSON, ALFRED JOHN LIVERSEDGE, and W. C. HOLMES & CO., LTD., have made application for the restoration of the patent granted for an invention entitled an "Improved gas-scrubber," No. 26,979 of 1911, and dated Dec. 2, which expired on Dec. 2, 1915, owing to the non-payment of the renewal fee.

Littleborough Gas Company.—At the half-yearly meeting last Thursday, the balance-sheet showed that the sales of gas for the last half year amounted to £5299, as against £5114 for the corresponding period of last year; the revenue profit being £1163, as compared with £1229. There was a balance of net profit (which was subject to the half-year's dividend) of £3810, against £3862. The usual dividend of 10 p.ct. per annum, less income-tax, was declared.

Darwen Gas-Workers' Wages.—The Darwen General Purposes Committee last week-end considered applications from the National Union of General Workers (formerly the Gas-Workers' Union) for increased wages for Corporation employees in almost every department. It was decided to recommend the Council to authorize an advance of 8s. per week on pre-war wages to all employees over 18 years of age, and 4s. under that age. In the Gas Department alone the increases over pre-war rates will total £1540 per year.

Brisk Demand for Gas-Cookers at Oldham.—At the last meeting of the Oldham Gas Committee, Mr. Isaac H. Massey (the Distribution Superintendent) reported that during the preceding fortnight there had been a brisk demand for gas-cookers, 144 having been supplied and fixed during that time. Alderman H. Wilde, J.P. (the Chairman of the Gas Committee), said the difficulty was the securing of labour for fixing. Women were being trained to do the work of the department; 24 now working as labourers, 11 as meter inspectors, and two as meter and stove fixers and repairers.

LEGAL INTELLIGENCE.

PREFERENTIAL CHARGES FOR ELECTRICITY.

A COMPLAINT BY THE GAS LIGHT AND COKE COMPANY.

Attorney-General v. Mayor and Corporation of Hackney.

JUDGMENT.

Judgment was delivered on Wednesday last in the action before Mr. Justice Astbury, in the Chancery Division of the High Court of Justice, in which plaintiff, suing at the instance of the Gas Light and Coke Company, complained that certain differentiation charges made by the defendants in the supply of electric energy were in breach of the Electric Lighting Act of 1882, and consequential relief and an injunction were sought [see "JOURNAL" *ante*, pp. 157-9].

Mr. Justice ASTBURY, after stating the facts of the case, proceeded as follows: The question of principle which is raised in this action is one of far-reaching importance to the owners of electric light undertakings in this country and to their customers. One of the principal objects of an electric light undertaking is to utilize its plant to the best advantage; and one method of accomplishing this result is to obtain customers for energy during the day as well as during the dark hours, and in each case to encourage customers whose hours of consumption do not synchronize, so that the diversity between them enables the plant to satisfy a greater number of hours of maximum demand than would otherwise be the case. The proportion of the actual number of units sold to the output capacity of the plant is termed, in this branch of industry, the "load factor" of the station; and the difference between the ratio of the load actually observed at the station to the sum of the loads at the consumers' terminals is termed the "diversity factor." Broadly stated, power users have a better load and diversity factor than light users, which accounts for their being usually charged a lower rate, because, other things being equal, the higher the load factor the lower the cost per unit of production, and the better the diversity factor the further the undertaking can go in the earning of revenue. The increase of the load and diversity factors therefore is of the greatest importance; and tariffs should be framed in order to obtain customers and classes of customers whose consumption contributes to this result. This being so, as a general rule it is obvious that a customer or a class of customers with a higher load factor, due to the taking of a different supply under different circumstances, is entitled, in the interests of the undertaking, to differential treatment in the matter of charges as compared with a customer or class of customers whose load and diversity factors are inferior. The sections of the Electric Lighting Act of 1882 which are in question are 19 and 20. Under section 19 it is enacted that: "Where a supply of electricity is supplied in any part of an area for private purposes, then, except in so far as is otherwise provided by the terms of the Licence, Order, or Special Act authorizing such supply, every company or person within that part of the area shall, on application, be entitled to a supply on the same terms on which any other company or person in such part of the area is entitled under similar circumstances to a corresponding supply." And section 20 provides that: "The undertakers shall not, in making any agreements for the supply of electricity, show any undue preference to any local authority, company, or person." In the present case, the exception in section 19 with regard to the Licence, Order, or Special Act does not apply; and it is the general enactment in the two sections which has to be considered. These sections say nothing about, and do not draw any distinction between, light, heat, or power users as such. The station turns out only one class of energy, which is measured in Board of Trade units; and the dissimilarity of circumstances and the non-correspondence of supply involved in section 19 must be looked for, not in any difference in the energy consumed or in the manner in which it is led into, and distributed by, wiring and meterage in the customers' premises, but in the circumstances of the customer in so far as they react upon the supply that he takes, and in the time, diversity, and quantity of his consumption. In other words, the purpose to which the consumer puts the energy which he purchases, whether for lighting, power, or heating, is *per se* irrelevant. It is in the *quantum* of, and the circumstances under which he takes, his supply of the one product that the undertaking offers for sale that the answer to the question as to undue preference must be looked for; and it is only for the purpose of classifying customers according to this test that they are, for convenience, divided into light, power, and heat classes—such purposes involving, as I have already pointed out, well recognized differences from the point of view of load factor, diversity factor, and quantity of units purchased. Customers may therefore be, and are in practice, divided into classes in accordance with these considerations, and they are charged with varying and different rates and classes of rates with the object of encouraging advantageous customers and classes of customers as well as of attempting to fairly adjust the respective advantages obtained by the station from all of them. This has led to what is termed different systems of supply being adopted—that is to say, for lighting, heat, power, &c.; the customers in each case taking the only thing that the undertakers have to sell, but under circumstances which affect differently the load factor of the station in both diversity and quantity. If the different systems of supply are fairly arrived at, and are at the choice of the customer, the preference prohibited by section 20 is between customers dealing under similar circumstances and not between customers dealing under different systems of supply, either of which they are free to select [see *Attorney-General for Victoria v. Melbourne Corporation*—1907 Appeal Cases, 469]; and to the extent that the customers under one system benefit the undertaking, in the way that I have described, to a greater degree than customers under another, so they are given a benefit in the scale of charges. This is expressed by Mr. Justice Sargant in the Long Eaton case in these words: "Any circumstances which render it less costly or otherwise more profitable to supply A than B constitute a legitimate reason for making a lower charge to A for the same supply." Nor is the right to differentiate the scale of charges confined to different classes of customers or to different systems. "There is left a latitude to the company to make bargains with its (individual) customers when circumstances differ or the supply does not correspond for different terms." Then what does corresponding supply mean? Does it mean that you are necessarily to treat the small customer upon equally advantageous terms with the large customer? The cost to the company may be very different—greater uniformity of demand, easier and less expensive collection of the amount to be paid, are circumstances to which regard must be had [Buckley, J., in *Metropolitan Electric Supply Company, Ltd., v. Ginder*, 1901, 2 Chancery, p. 811]. Therefore, any differentiation fairly arrived at between classes of customers or between customers in any one class *inter se* may be made by the undertaking, providing differentiation is not made between customers taking, or entitled to, supplies which correspond under similar circumstances, which is the only thing that is prohibited by sections 19 and 20. The plaintiffs in the present case rely on the Long Eaton decision. In that case the undertakers charged power users one rate for lighting and another rate for power, and provided that, under certain circumstances, a factory owner A should obtain his power supply at a less charge per unit than a factory owner B. Mr. Justice Sargant found as a fact that no circumstances existed in that case which rendered it less costly or more profitable for the station to supply A with power than to supply B for the same purpose, and that the supply of energy in the circumstances in the two cases corresponded and were similar. The learned Judge said: "Any supply of electricity for power is in the ordinary course taken quite separately from any other supply for lighting"—that, of course, was referring to the scale in that particular case—"namely, by a separate circuit connected with the mains by separate terminals and with a separate meter. This being so, I think that, according to any ordinary use of words, the Council must be said to be offering not a single supply of electricity but an alternative supply, and that any consumer taking for power and light in the ordinary way on separate circuits would be said to be taking, not a single supply but two supplies—namely, a supply for power and a supply for light; and I can see no sufficient reason for cutting-down the beneficial operation of section 19 so as to prevent its application to each such separate supply. In my judgment, the hypothetical consumer B, though taking a supply for power only, is taking a supply corresponding with the like supply of energy to A for power purposes, although A may also be taking an additional separate supply for light. And if any differentiation is allowed between them, *quâ* their respective supplies for power, it must be on the ground that the circumstances are not similar in the two cases." Then he adds what I think is the most important statement: "Under each section I think that the whole circumstances may be considered from the broadest possible point of view, and that one question is whether the circumstances affecting consumer A and consumer B in relation to their supply of power are substantially dissimilar or sufficiently dissimilar to justify broadly the differentiation proposed by the circular." After referring to certain authorities, the learned Judge then continued: "I think a fairly clear distinction may be drawn for the present purpose between those reasons for making a lower or preferential charge which under legislation of this kind are legitimate and those which are illegitimate. It would seem that A must not be charged less than B merely to overcome a greater reluctance on the part of A to become a customer, or to induce A to become a customer in respect of another supply, although either of these reasons might be a good commercial reason for charging less to A were the public undertakers merely carrying on any ordinary commercial business. Then he adds the passage that I have already read: "On the other hand, any circumstances which render it less costly or otherwise more profitable to supply A than to supply B constitute a legitimate reason for making a lower charge to A for the same supply." The Long Eaton decision was affirmed in the Court of Appeal; and the present Master of the Rolls in giving judgment, said this: "Suppose there are two factories, similar in situation, similar in extent, both of which are supplied with electricity for lighting and for power. Is there any reason for justifying different charges being made to the owners of the factories because one of them may have a portion of his factory, or another small factory, which is not supplied with electric lighting, but is supplied with gas, or acetylene gas, or whatever it may be? It seems to me that such a differentiation would be directly contrary to section 19, which says that each of these two owners is to be entitled to a supply on the same terms. They are not supplied on the same terms, though the circumstances are similar." In the present case before me, although the wording of the 1914 circular of the defendants, on which the action was launched, may be ambiguous, in the sense that the 20 p.ct. for light in the case of the power users was not expressly stated to be limited to factory lighting, his was put right in the circular and scale of charges issued in 1916, before the date of the writ; and in practice the defendants have not allowed the user of the 20 p ct. in question for purposes other than the lighting of the factory or workshop taking the power supply, nor have they threatened, or intended to do so, nor apparently has anybody thought that such was the case. And I allowed an amendment of the pleadings raising the 1916 circular in order that the case might be determined; and it has accordingly been argued upon the true facts.

> In the Long Eaton case, the undertakers differentiated between different members of one class of users—namely, factory or power users—without, as found by the Court, any corresponding benefit accruing to the Company or any legitimate reason existing for doing so.
>
> In the case now before me, all power users are placed on the same basis They all take one supply at the same rate or price per unit, and they are all allowed to use 20 p.ct. of such supply for lighting their factories or workshops, which must be lighted by some means or other if they are to take power supply at all.

A similar practice has been sanctioned by Parliament in many power companies, as explained in the evidence. That is to say, Parliament has sanctioned power companies competing with lighting companies in various districts on the terms that one-fifth of the supply taken by

the power user may be employed for light—this being based on the fact that factory and workshop lighting does not as a rule amount to, or exceed, one-fifth of the total quantity of energy taken. This treatment of power users, by avoiding, *inter alia*, the expenses of alternative or double supplies and extra wiring and meterage costs, is not suggested to be otherwise than a sound commercial plan for dealing with the owners and occupiers of factories and workshops, and, by increasing the load and diversity factors at the station and the total energy consumed, must tend, as soon as power customers are obtained in sufficient quantity, to improve the position and prospects of the undertaking (as it has long since done in Hackney), and is, in my judgment, a legal method of carrying on the undertaking. The plaintiff contends that, *quâ* the 20 p.ct. used for lighting purposes, the power users are given an undue preference over the ordinary "light" users of the borough; but in my judgment the circumstances affecting the latter in relation to their supply are substantially different and dissimilar, and justify, in the interests of the undertaking, the differentiation, if such it can be called, in their treatment. All factory or power users are put upon one basis and all non-power users on another; and I think that the true test in the case of the power user must take into account his total factory consumption and not the percentage of his supply that goes to meet one item only of his factory requirements. The 20 p.ct. arrangement is really only a particular method of reducing or regulating what would otherwise be the charge per unit for power. The plaintiff contends—and I think wrongly—that a light user who, as compared with a power user, has a bad load factor, little or no diversity factor, and whose consumption is relatively small, takes his light by way of corresponding supply and under similar circumstances if the light supply alone of the power user is considered. This is not in my judgment the fact, nor do I think that, for the purpose of considering sections 19 and 20, the amount of the total consumption of the power customer ought to be split up, and only one portion of it considered for the purpose of deciding whether the power customer himself, whose load factor is as a general rule the better, whose diversity factor is necessarily better, and whose consumption is entirely different, takes a corresponding supply under similar circumstances and is unduly preferred as compared with the light customer. The plaintiff has called evidence for the purpose of attempting to show that in the year 1913-14—the last full year before the war—the power users were supplied by defendants at a loss, and therefore that the test laid down in the Long Eaton case was not complied with. In the circumstances of the present case, I do not think that such evidence is relevant to anything that I have to decide, nor do I think it establishes that the defendants did not profitably carry on their undertaking, or that they supplied energy for power in the year in question at a loss. The defendants have called evidence in answer, and a great mass of figures and accounts have been put in. All I propose to say on this part of the case is that if the contention so raised on the evidence by the plaintiff is relevant, he has not established the facts on which he relies in its support.

I will now deal with a series of hypotheses or propositions put forward on behalf of the plaintiff in reply, which it is said bring this case within the decision in the Long Eaton case, and establish that an undue preference is given by the defendants *quâ* the 20 p.ct. of energy taken by the power customer who avails himself of the option in question and uses it for light.

(1) It is said that a factory owner in Hackney who takes light and no power pays more for his light than an owner of a similar factory who takes both. Why should not he? There is no magic in his having a factory as distinct from any other kind of building for which he takes light alone. The Act does not say that all owners of factories, independently of their circumstances and supply, are to pay the same rate, and this is simply the case of a light user and power user as between whom, for reasons I have stated, the undertakers are entitled to differentiate.

(2) It is next stated that the 20 p.ct. is not equivalent to a reduction in the price of power to get the power customer in, in that it does not reduce the charge for power because the customer takes light, but only reduces the charge for light because the customer takes power. This is plausible, but I think fallacious. What the station alone is concerned with is the *quantum* and diversity of the customers' supply. And it is with the customers as individual users that the Statute is concerned. If one customer takes a totally different supply under totally different circumstances to another customer, it is irrelevant that he is allowed to allocate a portion of his whole supply, which *ex hypothesi* he is entitled to at a lower rate, to a purpose similar to that to which another customer paying a higher rate, because of the difference in his circumstances and supply, devotes the whole of his. This attempt to place the light customer and the power customer *quâ* his 20 p ct. at Hackney in the position of two light customers corresponding to the two power customers in the Long Eaton case is entirely misleading. In the Long Eaton case, the two hypothetical customers were found, in fact, to be power customers whose supplies and circumstances were corresponding and similar; whereas in the present case the customers contrasted differ *in toto*, both as to supply and circumstances. And it does not alter the fact that the power customer takes under different circumstances a different supply for the whole of which he is entitled to a rate proportionate to his demand, that he uses one fifth of his supply for light or for any other factory purpose.

(3) It is then said that if you take the case of a power customer lighting his factory by gas, whose supply equals 100, all of which he uses for power, changing-over to electric lighting without otherwise altering his factory, and then taking a supply of 125, his power position is not altered, and that he is getting a new light supply of 25 on terms different and unfair to the light consumers. This involves the same policy. When the customer took his power supply of 100, he, in common with all other customers of the same class, was entitled, if he had been so minded, to use 20 p.ct. for light; and when he increased his total supply to 125, his relative position is in no way altered.

(4) Similar arguments were used with reference to a power user who, before the 20 p.ct. option was given, used the defendants' energy for lighting and for power, and after the change used the same amount for power and light, but paid less for the latter. What he really pays less for is for the whole.

(5) Finally, it is said that you must not mulct a light customer because he will not take power. I agree. You must treat him as the defendants have treated all light users whose supplies and circumstances are similar—on terms of equality.

For the reasons that I have endeavoured to give at some length, I am of opinion that no breach of the provisions of sections 19 and 20 of the Act of 1882 by the defendants has been established, and that they have not threatened or intended to supply energy otherwise than in accordance therewith. The action must therefore be dismissed with costs to be paid by the relators.

Mr. PERCY WHEELER (for the plaintiff): With regard to the costs, I rather gather from your Lordship's judgment that the defendants have escaped from the result of the Long Eaton case by reason of the amended circular and their amended defence; otherwise they would have come exactly within the judgment of the Master of the Rolls in having issued their previous circular in such ambiguous terms that the action was justifiable.

His LORDSHIP: I do not agree.

His LORDSHIP, on the application of Counsel, agreed to extend the time for giving notice of appeal to three months.

WILTS COUNTY GAS COMPANY, LTD.

The Official Receiver in the Company Winding-Up Division of the High Court of Justice has now issued his report under the liquidation of the Wilts County Gas Light and Coke Company, Limited, of No. 14, Victoria Street, S.W., and Pewsey, Wilts. From this, it appears that a statement of affairs has been filed, showing gross liabilities as regards creditors amounting to £652, of which £574 is due to unsecured creditors. The assets are estimated to produce £2929, from which £23 has to be deducted for the claims of preferential creditors payable in full, leaving the net assets at £2906, and showing an established surplus of assets over liabilities of £2358. With regard to contributories, the paid-up capital of the Company is £15,000, to meet which there is the above estimated surplus of £2358, leaving a total deficiency as regards contributories of £12,641.

The Company was, the report of the Official Receiver states, registered on June 23, 1914, with a nominal capital of £30,000, divided into 3000 7 p.ct. preference and 3000 ordinary shares of £5 each, for the purpose of manufacturing, selling, and supplying gas in Pewsey and the adjacent districts. The first Directors, who were appointed by the Articles of Association, were Sir George Kekewich, K.C.B. (Chairman), Frederick Charles Murray, Frederick Colman, and Albert Augustus Scanlan. Murray resigned, Colman is dead, Scanlan is on active service, and on Dec. 5, 1916, William Judd (the Secretary) was appointed to the Board to make a quorum. The qualification was the holding of one share; and the remuneration was fixed at fifty guineas per annum each, with fifty guineas extra to the Chairman. Sir George Kekewich has, however, refused to accept fees since May, 1916.

The Company was promoted by the United Gas-Works Development Company, Ltd., which appears to have been controlled by H. H. D'Aeth and James Gordon. The prospectus disclosed the following agreements between the Development Company and a Trustee on behalf of the Company: (*a*) For the purchase by the Company of freehold property at Pewsey, with the gas-works and buildings thereon, and all machinery, plant, gas-mains, &c., for £6450, payable as to £4450 in cash and as to £2000 in cash or shares at the option of the Company, together with the stock of coal, &c., at a valuation. (*b*) For the provision by the Development Company of the preliminary expenses up to £1800, in consideration for which the Company were to repay the £1800 and to allot as bonus 150 preference shares as fully-paid. By this agreement, the Development Company undertook to guarantee the interest on the issued capital for the first year—viz., 7 p.ct. on preference and 8 p.ct. on ordinary shares. (*c*) For the underwriting by the Development Company of £8000 capital for a commission of 7½ p.ct. No valuation of the property was obtained on behalf of the Company; but a report by Mr. George A. Smith (gas engineer) addressed to the Directors was printed and circulated with the prospectus. This report showed an estimated net profit of £4946 per annum, on the assumption that the mains would be extended to surrounding districts, and the gas supplied by the Company should reach 39,500,000 c.ft. per annum.

The Directors went to allotment on July 3, 1914, and between then and Aug. 5 issued, in response to prospectus applications, 938 preference shares and 1373 ordinary shares, representing respectively £4690 and £6865; nine shares taken up by the signatories and directors (£45); and 350 preference and 350 ordinary shares (£3500) issued as fully-paid—bringing the total issued capital to £15,100.

No independent inquiries in connection with the purchase appear to have been made by the Directors, who seem to have assented without demur to all the promoters' suggestions for the terms of purchase. The title deeds show that the property was acquired by D'Aeth from the Pewsey Gas Company, Ltd., in liquidation, on June 15, 1914, for £1300 in cash, and that he conveyed it to the Development Company three days later for £2500. The Directors took no steps to extend the mains beyond Pewsey, owing, the Secretary states, to the subscribed capital being insufficient. The accounts show:

For the year ended June 30. 1915, a loss of.	£1718
,, ,, ,, 1916, ,, ,, ...	1849
For nine months ended March 31, 1917, a loss of . . .	268

This result is attributed partly to mismanagement by the manager of the gas-works and to his irregularities, in respect of some of which he was convicted and sentenced in July, 1916. The quantity of gas sold has averaged less than 2,000,000 c.ft. per annum. A dividend for the first year of 7 p.ct. on the preference shares and 8 p.ct. on the ordinary shares was paid, out of a sum of £1015 provided by the Development Company, under the terms of an agreement.

In February, 1915, the Company advanced, for three months, after Counsel's opinion had been obtained that it had power to do so, £1000,

at 10 p.ct. interest, to the Development Company, on the security of £1000 debentures in that Company, and 4500 fully-paid shares of £1 each in the Mutual Industrial Corporation, Ltd. (another Company in which D'Aeth and Gordon were interested), and the guarantee of D'Aeth and Gordon. Of this amount, £360 was repaid; and judgment for a sum of £693 with interest, and £53 costs, has been obtained against D'Aeth and Gordon. But so far it has been fruitless. Both the Development Company and the Mutual Industrial Corporation are in liquidation. The debentures are understood to be, and the shares in the Mutual Industrial Corporation are, in fact, worthless. A sum of £500 was also advanced in July, 1915, on debentures to the East Pembrokeshire Light and Coke Company, Ltd.—another Company promoted by the Development Company; and on March 6, 1917, Judd was appointed by the Company as Receiver on its behalf. He is continuing the business, and states that the loan will eventually be repaid in full. The Directors state that at the dates when the advances were made the Company were not requiring use of the whole of their cash; and that they judged the Company would be benefited by the interest.

In March, 1917, the Company, having come to the end of the funds, and being unable to raise money by the issue of debentures, had to close-down the works. Subsequently an execution was levied there, on behalf of the petitioning creditor, under which all the moveable assets were sold, realizing £68.

KOPPERS COKE-OVEN PATENTS.

A Document from Germany.

A new phase in the conflict over the Koppers coke-oven patents was opened in the Patents Court, before the Controller (Mr. Temple Franks), last Thursday. The stages in these proceedings [see "Journal" *ante* p. 26, and Vol. CXXXVIII., pp. 153, 346, 628] may be briefly indicated as follows: Messrs. Simon-Carves, Ltd., applied for a licence to use the two German patents No. 20,870 of 1904 and No. 16,386 of 1905. Mr. Victor Derry (a British subject who changed his name from Kochs by deed poll) opposed the application, urging that Koppers passed on the English rights in his patents to a partnership consisting of Koppers, Derry, and C. R. Altenhein, and known as the Koppers Coke-Oven and Bye-Products Company. Mr. Derry now sought to put in a new document from Koppers; and Messrs. Simon-Carves opposed his application.

Mr. Hunter Gray appeared for Messrs. Simon-Carves; and Mr. H. Terrell, K.C., M.P., represented Mr. Derry.

Mr. Gray objected to the presentation of the new document from Koppers. He submitted: (1) That it was *ultra vires;* (2) that he was entitled to cross-examine Koppers if the Court paid any attention to the letter; and (3), that the opinion of Koppers (if it was no more than an opinion) was worth no more than Mr. Derry's, and that was worth nothing at all. A letter had been sent to Koppers which practically said: "It would be for your benefit, for the purpose of this opposition, to say that the patents belong to the partnership." It announced that "an application to work or suspend our British patents" had been made, and indicated Mr. Derry's line of opposition. It showed something was going to interfere with the goodwill which Koppers eventually hoped was coming back to him. "As you are aware," the letter went on, "it has long been the intention to have the patents formally assigned to the firm, and but for your absence in America in 1913, and mine in India, this would have been carried out before the outbreak of war. I should be glad if you would kindly send me an indication (preferably in your own handwriting), stating that it has been understood and agreed that the patents taken out by you in this country, at or since 1902, were the property of the three partners, in the proportion of half to yourself and a quarter each to Altenhein and myself, when I should have no difficulty in establishing the rights of the firm." Koppers replied: "In answer to your letter of May 4, I herewith testify that it has been understood and agreed that the patents taken out by me at or since 1902, are the property of the three partners forming the Koppers Coke-Oven and Bye Product Company, Sheffield, in the proportion of half to myself and one-fourth each to Mr. C. R. Altenhein and Mr. A. Victor Derry." It was further stated that Otto Ohnesorge, a patent agent of Bochum, had made a statutory declaration that Koppers, on April 3, 1913, instructed him by letter from New York to transfer the whole of his English patents to the partnership. The directions, however, were not executed, as Mr. Koppers and Mr. Kochs were travelling. Mr. Gray contended that this letter ought not to have been sent to Mr. Koppers. If it was sent, it should first have been submitted to the Controller and himself.

Mr. Terrell said he sent the letter at the suggestion, as he took it, of Mr. Justice Younger, who indicated a way by which this might be done.

The Controller held that this document of Mr. Koppers could only be put on the register if it affected the proprietorship of the patents. Standing by itself, he did not see how it could do this as it was a document made during the war.

Alleged Passing-Off of Incandescent Mantles.

On Friday last, the case of *The Wholesale Fittings Company, Ltd. v. L. Bernstein* came before Mr. Justice Younger, in the Chancery Division of the High Court, upon a motion for an injunction to restrain defendant, his servants, and agents, until judgment or further order, from in any manner representing that he was employed by, or connected with, the plaintiffs, or authorized to represent them, or to supply their goods, and from passing off, or attempting to pass off, incandescent mantles, or other goods not being the plaintiffs' goods, as and for the goods of the plaintiffs. Mr. Sebastian represented the plaintiffs. Defendant, who appeared in person, submitted to an injunction in the terms asked. Mr. Sebastian said it had been agreed to treat the motion as the trial of the action, and to take a perpetual injunction in the terms of the notice of motion. Considering the financial position of defendant, plaintiffs did not ask for costs. His Lordship said this was the second time defendant had been let off the costs; and he strongly advised him to sell his own mantles in the future.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Sheffield United Gas Light Bill was read the third time, with the amendments, further amendments made, passed, and returned to the Commons.

The Gas and Water Provisional Orders Bill was read the third time, according to order, and passed.

The South Eastern and London, Chatham, and Dover Railways Bill was read the third time, with the amendments, passed, and returned to the Commons.

HOUSE OF COMMONS.

Sulphate of Ammonia.

Mr. Acland asked whether the President of the Board of Agriculture was aware that during 1916 flat-rates were fixed for the sale of large quantities of sulphate of ammonia to farmers at prices considerably lower than those on the open market; that these prices made it a very attractive purchase to farmers, from which they had in general derived considerable benefit; that during two and a half months in the spring of that year export was suspended so that the supply for agricultural purposes might be ample; that the prohibition of export was finally withdrawn only because congestion at the makers' works threatened to interfere with the supply of necessary materials for munitions; that the rates fixed by the late Government were accepted by their successors as being fair and attractive to farmers; and whether a great deal of the increased use of sulphate of ammonia during the present season had been due to the efforts made in 1915 and 1916 to popularize and increase the use of this fertilizer?

Mr. Prothero, the President of the Board of Agriculture, said that the reply to the first four parts of the question was in the affirmative. The rates fixed by the late Government were used as the basis for subsequent negotiations with makers. But the altered system of distribution arranged in February last helped to stimulate the demand; and during the four months, February to May, 1917, the quantity sold for agricultural purposes was 99,875 tons, as compared with 35,128 tons in the same period of the preceding year.

MISCELLANEOUS NEWS.

EDINBURGH AND LEITH GAS ACCOUNTS.

The revenue account of the Edinburgh and Leith Gas Commissioners for the year ended May 15 shows a total income of £431,367, and an expenditure of £322,460, leaving a balance carried to net revenue account of £111,907, which is £6289 less than that for the previous year. The proceeds from the sale of gas are higher by £11,659 (due to the increase in price); those from coke, by £7997; while toluol and benzol—a new item—have brought in £18,657 (nearly 2¼d. per 1000 c.ft. of gas sold). Tar and sulphate of ammonia, however, did not do as well as in 1915-16. As regards expenditure, coal cost over £28,000 more (equal to 3s 2·18d. per ton); repairs and maintenance of works increased by £4543; rates and taxes, by £8435; and war service allowances, by £1486.

The charges against the net revenue account are: Annuities, £25,892; interest, &c., £36,106; sinking fund contributions, £33,036; reserve fund contributions, £21,516—a total of £116,550. This shows that the year's working resulted in a deficiency of £4643, which has been met by drawing upon the surplus of £5878 from the year 1915-16, leaving a credit balance on the account of £1235, as compared with a surplus estimated last September of £1003.

In his explanatory letter to the Finance and Law Committee, the Treasurer (Mr. A. Canning Williams) points out how very closely many of the estimated figures approach the actual ones. The convener of the Committee (Mr. Douglas Elliot), in moving the adoption of the accounts, also referred to this, and said he thought congratulations should be offered to the officials on the fact that, though they had had to deal with so large a revenue as £434,000, the difference between the estimated and the actual surplus was only about £200.

The quantity of gas sold during the year was 1,874,114,100 c.ft., a decrease of 75,299,900 c.ft. (3·86 p.ct.) on the previous year's sale. The make of gas per ton of coal and oil equivalent was 10,725 c.ft. (against 10,958 c.ft.); and the unaccounted-for gas was equal to 6·26 p.ct. (against 5·75 p.ct.) on the make.

On capital account, £2248 had been spent for additional meters; but as £2516 had been written-off in respect of depreciation on cookers, fires, &c., the net result was that the total capital expenditure, which stood at £1,832,965 on May 15, 1916, had been reduced to £1,832,697. Annuities and mortgages amounting to £48,634 had been redeemed during the year, and the financial position of the undertaking improved by £60,180—viz.:

Sinking fund contributions and interest		£36,611
Saving on purchase during year of annuities below their capitalized value		4,932
General reserve fund increased by		2,655
Amount written-off dead capital in respect of old works		20,625
		£64,823
Profit and loss account—credit balance reduced by		4,643
		£60,180

As Mr. Williams observes in his memorandum, the times are so much out of joint that no very useful purpose would be served by

an elaborate comparison of the figures for 1916-17 with those for 1915-16. There is, however, something to be said for making a comparison between the year 1916-17 and the pre-war year 1913-14.

Sale of Gas.

	Year Ended May 15, 1914. Cubic Feet.		Year Ended May 15, 1917. Cubic Feet.
Ordinary consumers	1,660,947,700	..	1,567,388,000
Engines, &c.	114,411,600	..	135,771,600
Prepayment consumers	91,180,600	..	113,904,100
Stair lights	66,843,600	..	52,375,500
Public lamps	83,491,400	..	1,022,300
In bulk	2,366,800	..	3,652,600
Total	2,019,241,700	..	1,874,114,100
Gas made per ton of coal and oil equivalent	11,003 c.ft.	..	10,725 c.ft.
Average cost of coal and oil equivalent per ton	13s. 5·53d.	..	17s. 9·68d.
Cost of coal and oil per 1000 c.ft. of gas made	1s. 2·68d.	..	1s. 7·92d.
Net revenue from residual products per ton of coal and oil equivalent	8s. 4·57d.	..	12s. 2·94d.
Number of ordinary consumers	83,656	..	83,168
Number of prepayment consumers	12,650	..	15,370
Price of gas to ordinary consumers	2s. 8d.	..	3s. 4d.
,, ,, prepayment consumers	3s. 3d.	..	3s. 9½d.
Average price of gas per 1000 c.ft.	2s. 7·18 net	..	3s. 2·99d. net
Number of gas-cookers on free loan	16,592	..	19,210
Number of gas fires and radiators on simple hire	5,141	..	8,331

Adverse war effects may be seen in the reduced gas consumption of the public lamps (from over 83,000,000 c.ft. to a little more than 1,000,000 c.ft.), in the higher cost of coal and oil equivalent, and in the price of gas. On the other hand, the net revenue from residuals has risen very considerably, and the number of gas-cookers on free loan, and fires, &c., on hire, has materially advanced. No doubt in any case these appliances would have shown an increase; but the war has accelerated it.

The Convener of the Works Committee (Mr. Lindsay), in referring to the recent Coal Transport Order, said that they, as Commissioners, would not be greatly affected or inconvenienced by the order. They had recently bought 195,000 tons of coal; and only some 15,000 or 20,000 tons of this would be affected. They had hitherto drawn their supplies, other things being equal, from the nearest possible collieries. By September, most of the 15,000 to 20,000 tons would be delivered.

ANNUAL REPORT AT BUXTON.

In presenting his sixth annual report to the Buxton Gas Committee, Mr. F. G. Shaw (the Gas Engineer and Manager) says that, considering the small increase made in the price of gas compared with most other undertakings, the decreased output of gas, and the difficulties caused by the war, he thinks the net profit of £1536 for the year ended March 31 will be regarded as satisfactory. The price of gas for lighting is 2s. 9d., and for cooking, heating, and power 2s. 6d. per 1000 c.ft.—in each case subject to 5 p.ct. discount for prompt payment. The gas made was 116,346,000 c.ft., or 12,002 c.ft. per ton of coal carbonized; the figures for the preceding year having been 131,968,000 and 12,049 c.ft. respectively. On this occasion, the percentage of unaccounted-for gas is 5·62; whereas a year ago the figure was 5·14. The net profit of £1536 now compares with £2595 twelve months ago.

Dealing with the working results, Mr. Shaw remarks that the decreased output of gas for the past year compared with the previous year is 15,622,000 c.ft., and the reduction in the coal carbonized is 1258 tons. The decrease is due to the lighting restrictions, daylight saving, and the smaller number of soldiers billeted in the town. The residuals results, and generally the working results, are very satisfactory indeed. The coke sold (10 cwt. per ton of coal) is gratifying; and it is most timely that the improvement in this item should be brought about during the period of good prices. The gas accounted for shows an increase in percentage on the reduced make, due to the large number of leakages from fractured mains and services caused by the hard frosts of the past winter. The figure is better than was expected. The financial results are satisfactory. Coal, owing to the reduced quantity carbonized, has cost £1009 less than last year. The outstanding feature of the expenditure is the rates and taxes item—£2005—which is £707 more than last year, and £1317 more than it was in 1912, when a similar tonnage of coal was carbonized. The revenue shows a reduction in income from gas sold of £1793. The past year has been a most trying and anxious one—especially during the winter. Thanks, however, to the loyal manner in which the staff and workmen have done their duty, and a certain amount of good fortune, no accidents of a serious nature have occurred. Hardly the bare minimum number of men fit for the arduous and exacting work necessary to keep up the supply of gas now remain. On several occasions, the pressure of gas to the town has had to be reduced, through lack of men fit for stoking work.

SMETHWICK GAS ACCOUNTS.

Mr. W. J. Sturges, the Secretary to the County Borough of Smethwick Gas Department, in his report to the Gas Committee, when submitting the accounts for the year ended March 31, says that the total income from all sources on revenue account amounted to £97,587, compared with £93,148 in the previous year—an increase of £4439. The net revenue from sales of gas was £68,026, being an increase of £124; and the average net price realized for all gas sold was 2s. 5·038d. per 1000 c.ft., as against 2s. 5·156d. The total quantity of gas sold and accounted for was 562,243,400 c.ft., an increase of 3,297,600 c.ft., or 0·59 p.ct. The quantity of gas unaccounted for, due to leakage, condensation, &c., was 32,223,700 c.ft., or 5·42 p.ct. of the gas sent out, as against 5·45 p.ct. in the previous year.

Collections from prepayment meters averaged £2 15s. 5d. per meter for the year; and the average consumption per meter was 16,630 c.ft. The aggregate income derived from residual products was £29,191, as compared with £24,901, an increase of £4290. An additional item of revenue—spent oxide—is this year brought into account under residuals, as the sales of this material have, in addition to defraying the entire cost of purification of gas, brought in a surplus of £352. The total expenditure on revenue account amounted to £76,718, which is an increase of £2468. The average cost of coal carbonized was 20s. 8·8d. per ton, against 19s. 11·7d. the previous year; and the net cost of manufacture of gas, after deducting the value of residual products, works out at 1s. 1·316d. per 1000 c.ft., as compared with 1s. 3·026d. or 1·71d. per 1000 c.ft. less than in the previous year. Public lighting charges show a decrease of £1137; and rates and taxes an increase of £1651. The total amount paid in wages during the year was £19,531, an increase of £1009.

The gross profit on the year's trading was £20,869, as compared with £18,898. To the balance of £7108 brought forward from the previous year has been added the gross profit from revenue account of £20,869. After making due provision for interest on loans and redemption and extinction of debt, amounting in the aggregate to £12,960, there remains as the net profit for the year the sum of £7909, an increase of £1205. Allowing for the contributions of £50 to the funds of the Free Library Committee, and £181 for public lighting to the general district rate, there remains a balance of the year's net profit of £7677 transferred to the depreciation and extension fund account, which leaves the profit and loss account with a balance of £7108 to carry forward, as in previous years. This account commenced the year with a debit balance of £3028; and further expenditure on vertical retorts amounting to £277 has been added, making a total of £3305 5s. 10d. After crediting the sum of £7677 brought from the profit and loss account, there remains a balance to the good of £4372 available for further extensions and improvements now in hand or in contemplation.

Comparative Statement of Working Results.

	1916.	1917.
Coal carbonized . . . . . tons	45,277	45,189
Gas made total . . . . cubic feet	591,028,000	594,467,100
Coal gas . . . . . ,,	577,981,000	590,665,100
Per ton of coal . . . ,,	12,765	13,071
Water gas . . . . . ,,	13,047,000	3,802,000
Gas unaccounted for . . . . per ct.	5·45	5·42
Proportion of gas sold to private consumers—		
Lighting purposes . . . per ct.	74·55	72·32
Power . . . . . ,,	24·13	27·62
Public lighting . . . . . ,,	1·32	0·06

THE DUKINFIELD GASHOLDER FATALITY.

Verdict of the Coroner's Jury.

On Monday of last week, Mr. J. A. K. FERNS (the Deputy-Coroner for Cheshire) resumed the inquiry into the circumstances attending the death, on June 14, of George Greenhalgh, a labourer employed at the Dukinfield Gas-Works, who received fatal burns on the occasion of the munition works explosion at Ashton the previous day, as fully recorded in the "JOURNAL" at the time. At the opening of the inquest, only the evidence of the widow as to identification was given.

Mr. ALLEN HOWARD represented the Dukinfield Corporation and Mrs. Greenhalgh. There were present Mr. W. F. IRELAND (H.M. Inspector of Factories), and Mr. W. LINDLEY (Manager of the Gas-Works).

George Lindley, foreman at the gas-works, said on June 13 he was at the gas-works at 4.15, when his attention was called to a fire about 300 yards away, in Ashton. The building was ablaze from end to end. He climbed to the top of one of the gasholders to get a better view. A dense volume of black smoke and flame was being blown towards the gasholders from the chemical works. He deemed it safer to leave the top of the holder, and he got on the oxide shed. The moment he got on the shed, a loud explosion occurred at the chemical works. Everything went dark; and he found himself lying on the ground close by the boundary wall dividing the canal and the gas-works. The force of the explosion had carried him about 50 ft. He did not think he lost consciousness. He heard a voice calling for help, and going to the place whence the call came, found Greenhalgh about 30 yards from the gasholder. He was staggering about the yard with his clothing on fire. Witness tore the clothes from his body, and wrapped his own jacket round him. He then left Greenhalgh in charge of two of the workmen, hurried into the works, and closed the valve of the gasholder in use. The other holder was shut-down. He next went and shut-down the plant, to prevent any explosion. At this time the gasholder in use was in full blaze. The hot material which came flying over from the chemical works perforated the holder, liberated the gas, and set it on fire.

Mr. HOWARD: Then Greenhalgh must have been set on fire by the burning gas coming from the holder?

Witness: Yes.

He must have been near the holder?—Yes. Near No. 1 holder.

In your opinion, there was no explosion at the gas-works?—None whatever.

Did the gasholder seem to collapse?—Yes.

The DEPUTY-CORONER, in summing up, after further evidence had been given, said that no one at the gas-works was to blame. The gasholder got on fire, and Greenhalgh was fatally burned. The foreman Lindley showed very courageous conduct after he had been blown a considerable distance, in going to Greenhalgh and extinguishing his burning clothing. He also showed commendable coolness in shutting off the gas supply and preventing further damage. From the evidence given, the only verdict the Jury could return was that Greenhalgh met his death through shock from burns sustained by the firing of the gasholders through the explosion at the chemical works.

The Jury returned a verdict of "Accidental death."

WELSBACH LIGHT COMPANY, LTD.

A Dividend of 5 p.ct. Declared.

The Sixth Annual General Meeting of the Company was held last Thursday, at Winchester House, Old Broad Street, E.C.—Mr. J. R YATES (the Chairman) presiding.

The SECRETARY (Mr. E. J. Butcher) read the notice convening the meeting, and the Auditors' certificate; and the report of the Director and the statement of accounts were taken as read.

The CHAIRMAN, on rising, said that for the third year they were meeting in an atmosphere of war. To no commercial concern had this meant more than to the Welsbach Company; and to no body of men vested with the responsibility of directing a public company had it meant more than to this Board. Now that they were in a position to present such a balance-sheet as that to which he was about to refer, it was not inopportune to point out that from the outbreak of war the Directors had had to face a position, not only of difficulty, but of peril to the interests of the Company; and no one could then have predicted that they would at the present date have been able to come before the proprietors showing a condition of recuperation and stability such as was now disclosed. Among other entanglements which they inherited, there was the huge Austrian investment on the one hand, and, on the other, the still larger holding in this Company of the German Company (the D.G.A.). Further, the cutting-off of supplies of raw material, and the endless trading difficulties, contributed to a situation calling for the most careful and judicious handling, both on the commercial side and as regarded what might be termed the higher policy and direction of the Company. It required an unprecedented amount of daily and continuous work, thought, and initiative in order, if possible, to preserve the capital and safeguard an important British industry. The negotiations which, with the concurrence of the Foreign Office, the Board of Trade, and the Public Trustee, took place at Berne last September, culminated in the agreement by which the Company sold to the D.G.A. their entire shareholding in the Austrian Company, receiving in exchance the whole of the shares and debenture stock held in the Company by the D.G.A. In addition to taking over the German-owned shares, which numbered 173,048 out of the total of 265,000 shares, and £68,359 of debenture stock, out of the then outstanding amount of £212,000, the Company received also a release from certain debts and claims amounting to £3154; and they would be entitled to receive from the Public Trustee dividends and interest accrued on the shares and debenture stock taken over, amounting to £9710, as well as the balance of a cash payment of £5000 undertaken by the D.G.A. This cash payment the D.G.A. were entitled to satisfy by tendering further debenture stock at the price of 70 p.ct., which they had done to the extent of £5762 of stock; so that only a sum of £966 in cash would now be accruing under this head, to be paid in due course out of the funds in the hands of the Public Trustee.

THE ELIMINATION OF THE AUSTRIAN AND GERMAN INTERESTS.

This momentous deal with the D.G.A. was of undoubted benefit to their Company. What did they give up? They gave up the Austrian asset, standing in their books at £179,617, but, with the existing outlook, having no immediate value, and very little potential value, for their Company—an asset which they could not effectively control, even in peace time. In return, they received shares, debenture stock, and cash to the nominal amount of £255,237; and although some of the shares had been re-issued to their own shareholders and stockholders on terms realizing less than par, yet they were able to improve their balance-sheet by an amount substantially in excess of the value of the asset sold—namely, £215,270, as against £179,617—while their own members had had an opportunity of increasing their holdings on favourable terms. The matter might now be looked upon as having been completed, and the former German interest entirely eliminated. One of the terms of the transaction was that the guarantee of the D.G.A. in respect of the principal and interest of the debenture stock should be cancelled; and this had been done. In parting with this guarantee and with such a substantial portion of their security as the Austrian shares, the debenture holders gave up what they had always looked to as a material element of their security. But their interests were protected in part by the cancellation of the debenture stock taken over from the D.G.A., which reduced the debenture debt from £212,000 to £133,746. In order to strengthen the impaired security of the debenture holders, and to provide the Company with additional working capital, it was decided to issue 83,048 of the shares, and that their shareholders should have a prior right to subscribe—thus offering them an opportunity of retaining for themselves the benefit of the arrangements that had been made. Subject to their claims, the debenture stock holders had the right to apply. Many shareholders came in and applied freely; and some of the debenture holders also received a moderate allotment. Of the proceeds of the issue, £43,082 had been invested in 5 p.ct. War Loan, in accordance with the Treasury stipulation, and stood in the names of the Trustees for the debenture stock holders of the Company, to reinforce the security for the debenture stock. In carrying out these transactions, the Board had been considerably aided by the courteous assistance of the Foreign Office, the Board of Trade officials, the Public Trustee's Department, and the officers of the High Court; and they desired to make public their cordial acknowledgment of the broad-minded consideration they had met with. This aid had been invaluable; and without it the carrying out of these difficult and complicated transactions would have been impossible. The issued capital of the Company now stood at £175,000 in £1 shares fully paid up, leaving 90,000 shares available for future issue, if required. These shares, however, could not be issued except by an extraordinary resolution of the Company. The ordinary shareholders, therefore, need not be under any apprehension of an unexpected issue of the shares. The debenture stock now stood at £133,746; and after the termination of the war, it was proposed to realize some of the War Loan, and

: WRIGHT'S :

GAS-HEATED OVEN

FURNACES

for Annealing, Hardening, and other Heat-Treatment of METALS. . . . .

VERY STRONGLY CONSTRUCTED.

LARGE RANGE of STANDARD SIZES.

UNIFORM TEMPERATURES SECURED.

ECONOMICAL GAS CONSUMPTION.

JOHN WRIGHT & Co.

ESSEX WORKS . . BIRMINGHAM.

invite tenders from the debenture stock holders, so that they might reduce the amount of the issue to (say) £100,000.

THE FINANCIAL POSITION.

As to the accounts, goodwill, trade marks, patents, &c., stood at a very small amount; and in the judgment of the Board, the values were much in excess of the figures shown in the balance-sheet. A careful study of the balance-sheet would, he thought, convince the proprietors of the intrinsic soundness of the Company's present position, and of its financial strength. The Company was now perhaps in a stronger and sounder position to meet competitive business than in the whole course of its history. On the debtor side of the balance-sheet, provision had been made by the sum of £15,993 for the payment of excess profits duty for the two years ended March 31, 1916. This question had been a very thorny one to the Company. Endeavours to adjust matters had involved numerous interviews with the officials, who had eventually been persuaded to take a modified view. This had enabled them to arrive at a standard which was far more satisfactory than at one time seemed probable. Turning to the profit and loss account, the profit on trading for the year, after providing for the items mentioned in the accounts, was £40,013, as compared with £26,427 for the previous year. This amount of profit, he might mention, had been arrived at without any aid from the Munitions Department, which, indeed, had involved some loss. With the dividend of £15,074 on shares in B. Cars, Ltd. (against £14,673 for the previous year), there was a total profit to be dealt with of £57,329. The items on the other side of the account were more or less on the usual scale. After providing for interest on debenture stock, depreciation, &c., the balance of net profit (subject to excess profits duty) was £30,512. This (with the balance of £2040 brought forward) permitted the Directors to recommend that a dividend of 5 p.ct. be declared, which would require £8750, less income tax, and leave a balance of £23,802 to be carried forward. As to the workpeople and staff, they had again looked after the families of those employees who had joined the forces; and the number of those who had done so exceeded a hundred. The few eligible men the authorities had permitted the Company to retain were mainly in a low medical category; but they were doing their work cheerfully and well.

THE TRADING OUTLOOK.

The present trading outlook of the Company, provided they received the supplies of raw materials contracted for, and could retain sufficient labour, appeared satisfactory—thanks to the able management of Mr. B. Cars. If, after the war, they were reasonably free from dumping of cheap foreign goods, the Company should have a successful future. In carrying out the work to which the Directors had set their hands, they looked for the whole-hearted support of the shareholders. He concluded by moving the adoption of the report and accounts, and the declaration of a dividend of 5 p.ct.

Mr. CHARLES LOCK formally seconded the motion.

SERVICES ACKNOWLEDGED.

Mr. G. COLLIS congratulated the Chairman and his colleagues on the very successful way in which the negotiations had been carried through, and on the satisfactory balance-sheet that had been placed before the shareholders. The Company, he said, were exceedingly fortunate in possessing Directors who were able to grapple with such a difficult position as that with which the Board were faced after the outbreak of war. The profit was a very satisfactory one; and they were quite justified in looking forward to a continuance during the present year of the progress they had witnessed in the past.

The resolution was then carried unanimously.

Thereafter Mr. Robert Cars was re-elected a Director; and Messrs. Deloitte, Plender, Griffiths, and Co. were re-appointed Auditors.

The proceedings concluded with a hearty vote of thanks, on the proposition of Mr. COLLIS, to the Chairman, Directors, and staff.

OSWALDTWISTLE GAS UNDERTAKING.

Further particulars are now available of the results of the Oswaldtwistle gas undertaking for the last financial year, brief reference to which was contained in the "JOURNAL" last week [p. 167].

The gas made amounted to 83¾ million c.ft., being practically the same as in the previous year. The loss in domestic consumption due to the Summer Time Act had been made up principally by power users. The coal carbonized was 6673 tons, as against 7364 tons—a saving of 691 tons for the same output of gas. The make of gas per ton of coal carbonized was 12,550 c ft., which is the highest figure reached in the history of the undertaking. The cost of coal was £6379, an increase of £880; the average increase being slightly over 4s. per ton. The average net price received for gas was 2s. 7·6d. per 1000 c.ft., as against 2s. 3·8d. per 1000 c.ft., being an increase of 3·8d. The total revenue from gas amounted to £10,334, and from residuals to £4569, making, with miscellaneous revenue, a gross income of £15,578. Expenditure totalling £11,932, there remained a gross profit of £3646 (as against £2662), which, after payment of interest on loans and sinking fund charges, left a net profit of £1004—or £843 more than in 1916.

Mr. T. C. Usher (the Chairman of the Gas Committee), in his review of the year's work, said that coal supplies have been the cause of considerable anxiety; but they were able to overcome their difficulties with very creditable comparative results. The foresight of the Gas Committee, early in 1915, in sanctioning an installation of coal-elevating and conveying plant, together with stoking machinery, gave cause for congratulation. These labour-saving appliances had proved an invaluable boon. The Gas Committee were fully alive to the great future possibilities of the industry, and appreciated the necessity of having a means of cheap power, in local as well as national interests. They were willing to facilitate any scheme for the extension of the field of gas for power or industrial use.

The
DAVIS
Gas Stove Co., Ltd.

On War Service

—but still exerting strenuous efforts to meet the demand for Davis Gas Appliances

The Gas Exhibition Salons,
60, Oxford St., London, W. 1.

RETORT-HOUSE WORK AT GRANTON.

Mr. W. R. Herring's Report.

A brief reference was made in the "JOURNAL" for the 3rd inst. (p. 28) to the suggestion by the Consulting Engineer (Mr. W. R. Herring) to the Edinburgh and Leith Gas Commissioners that, in return for higher pay, the retort-house men should do a greater amount of work. The report on this matter is now available, and from it the following particulars have been extracted.

Mr. Herring states that, since the Granton works were opened, the Commissioners have frequently dealt with the question of the work of the stokers in relation to their pay. In 1912, when they demanded some increase of wages, Mr. Herring and the Resident Engineer (Mr. Alexander Masterton) prepared a joint report, wherein they remarked that they did not know a gas-works in the country where the men had so little actual manual labour during their eight-hour shifts as at Granton; and, as they had so much spare time between the periods of work, it had occurred to them to suggest that the men might be disposed to do more work if they received higher remuneration. The scale of work and wages, as it existed in 1912, was carefully determined after protracted labour troubles at Granton. The Commissioners were conscious at the time of giving the men exceptionally favourable terms; but it had never since been thought fair to revise them. Records had been kept of the duration of actual work by the stokers, &c., from the moment they commence their rounds to the moment they sit down again; and it amounted to less than four out of the eight hours. The work is intermittent, and is allotted somewhat as follows: Two men charge 21 retorts per round hourly, and four men draw this number, which equals for each "charger" 10½ retorts in twenty-one minutes, and for each "drawer" 5¼ retorts in twenty-one minutes. After allowing, on an average, four minutes for sweeping-up, the "charger" has the remainder of the hour—viz., thirty-five minutes—for rest; but the "drawer" is sometimes employed a little longer, as he has to clear choked pipes, clean tar from shields, and scrape mouthpieces when required, which averages eight minutes per round, leaving him thirty-one minutes' rest out of each hour. The Engineers suggested that if the men would undertake to operate ninety-four retorts per shift, instead of eighty-four, their wages should be increased by 1s. 9d. per week, or 3d. per shift.

The schedule of times recently submitted by the men, Mr. Herring states, varies to some extent from the foregoing; but "time records, compiled with a specific object in view, may be reasonably looked upon as suspect." So far as the plant was concerned, and the method of using it, no change had taken place between 1912 and the present time, neither had any change taken place in the character of the coal used, nor in the period of charging and drawing. The only change that had been made had been in the introduction of new hands; and their inexperience may have added slightly to the period of labour.

Mr. Herring was quite satisfied that the large increase in the number of "stopped pipes" arose from this cause, and perhaps to some extent from want of close supervision over the new men by their respective foremen. The choking of the gas take-off pipes is inherent in all gas systems, and unless nipped in the bud becomes a very obstinate and frequent source of trouble. It depends primarily upon the operatives whether there are few or many stopped pipes. If, after the lighting up of a setting, a pipe is once neglected, and the "choke" is allowed to creep up the barrel, that pipe will be troublesome throughout the entire life of the retort, unless the retort is "set down," and a special gang of men employed to clean it from the top downwards.

After a careful perusal of the report of the meeting between the Commissioners and the representatives of the retort-house hands, Mr. Herring says that he sees no reason to alter his views as to the ability of the men to take on an additional amount of work for a proportionate amount of pay; and he suggests to the Commissioners that they should make offers to the men on these lines.

As reported on the 17th inst., the retort-men have decided that they are unable to do more work. So the question of their wages will form a part of the arbitration proceedings on the demand of the employees for an increase of 10s. per week.

WAGES QUESTION AT MANCHESTER.

In the "JOURNAL" for July 10 (p. 74), reference was made to the decision of the Workmen's Special Committee of the Manchester Corporation to recommend the City Council to grant a war allowance of 9s. per week to all adult male employees whose wages or salaries amount to 26s. per week and upwards (up to £300), and 4s. 6d. for junior and female employees.

Mr. Fleming Eccles, the Organizing Secretary of the National Union of General Workers, writing to the Deputy Town Clerk, under date July 13, says he is instructed by his Executive to say "that the 9s. proposal cannot be accepted, and the men are fully justified in pressing for 12s. per week pre-war increase, for the reason that Corporation employees are generally paid at a lower standard than men engaged by private employers and limited companies." The communication goes on to say: "It is quite impossible to restrain the men much longer; and if you are now unable to give an immediate favourable reply, we have to request that the difference be at once referred to the Ministry of Labour for settlement." Six days later the Organizing Secretary wrote that "nothing less than an advance of 10s. 6d. per week, as and from April 11, will satisfy the workpeople on whose behalf we are entitled to act; and we feel it would be useless to appeal to the workpeople again for further patience."

At a meeting of the Workmen's Special Committee, held on July 20, it was decided that the men's application for 12s. per week pre-war

Gas Plant and all constructional Steel and Iron Work.

Specialists in Slot Meters, Ordinary Meters, Wet & Dry.

WILLEY & CO., LTD., ENGINEERS,

EXETER, LONDON, MANCHESTER, LEICESTER.

The Pioneers of Slot Installations.

Gas Fires.

Gas Fittings.

Gas Cookers.

PICKERING'S VALVE. LIVESEY WASHERS.

Telegrams:
"WILLEY, EXETER."
"GASVILLADO, KINLAND, LONDON."
"METERS, LEICESTER."
"WILMETER, MANCHESTER."

Telephone Nos.:
132 EXETER
224 DALSTON, LONDON.
4777 LEICESTER.
7419 CITY, MANCHESTER.

NOTE ADDRESSES.

Head Offices: EXETER.
London Works and Offices:
89-95, HERTFORD ROAD, KINGSLAND, N.
5, Oxendon Street, LEICESTER.
John Street, Booth Street West, MANCHESTER, S.W.

increase should be referred to the Committee on Production for arbitration, the terms of reference to be as follows: "The Council, when the original application was made, had already granted a war allowance of 6s. 6d. per week, which was increased on July 4, 1917, to 9s. per week. The employees, through their Union, express dissatisfaction with the amount of this advance; so this Committee agree to the matter being referred to the Committee on Production for their opinion as to whether such advance is a reasonable one or otherwise."

The matter will, it is expected, be further discussed by the City Council at their monthly meeting to-morrow (Wednesday).

EDINBURGH GAS-WORKERS' ARBITRATION.

The National Union of Corporation Workers put forward, a few months ago, a claim on behalf of the Union members employed by the Edinburgh and Leith Gas Commissioners for an additional war bonus of 10s. per week. It was decided between the parties that the question should go to arbitration; and the Chief Industrial Commissioner recently appointed Sir Richard Lodge (Professor of History in the Edinburgh University, and a brother of Sir Oliver Lodge) as Arbitrator. The hearing took place at the Granton Gas-Works last Wednesday; and the following is the text of the award:

After careful consideration of the very clear and temperate statements put before me by the two parties, and having regard both to the altered value of money and to the various benefits, apart from wages, enjoyed by the permanent employees of the Commissioners, I have resolved to award to the workers concerned, including the gas-fitters and the meter readers, but not including the consumers' ledger clerks, an additional war bonus of 5s. per week, to be paid as and from the first pay-day in the current month. The additional war bonus hereby awarded is not to be taken into account in the calculation of payment for overtime or for work on Sundays and holidays.

Note.—While it is impossible, in existing circumstances, to forecast the future, and to fix a definite limit of time within which no demand for increased remuneration may be put forward, it is to be hoped that this award will give sufficiently substantial relief to render further demands unnecessary as long as the country can escape any abnormal economic disturbance.

Apropos of the consumers' ledger clerks, a vote by ballot was taken a week or two ago in the Treasurer's Department; and out of a total permanent staff not on war service of 40, only seven voted in favour of the Union looking after their interests—the remaining 33 preferring that the Commissioners should deal with salary and bonus questions on representations by the head of the department.

Mr. W. G. Weyman, the Secretary of the Henley-on-Thames Gas Company, who about a month ago joined the 2nd Reserve Cavalry, at Newbridge Barracks, Ireland, has been promoted to the rank of sergeant—the rank he held when he retired, a few years ago, from the Q.O.O.H.

MANSFIELD GAS PROFITS.

The accounts of the Mansfield Corporation Gas Committee for the year ended March 31 show that the total gross profit on the year's working has been £10,317, as compared with £10,426 in the previous year. After allowing for interest on loans (£5067) and contributions to sinking funds (£3524), a net profit on the year's working remains of £1648, as compared with £1876 last year.

The amount received from the sale of gas is about £870 less than in the previous year. Residuals have realized about £904 more. The expenditure on the manufacture of gas has been £1250 less, mainly owing to the decrease in production. Rates and taxes were nearly £1000 more, and outlay on war relief and war bonus £570 more.

An application was made to the Local Government Board for sanction to a further loan of £2000, to enable the balance due for gas-stoves to be paid; and this was duly received. Permission was also given to raise £3144, balance of a loan of £4000 previously sanctioned. The Committee have decided to pay over £750 to the general district rate, and to appropriate the balance of £898 to the reserve fund.

The Diesel Engine Users' Association intimate that the Inland Revenue Authorities have now agreed to increase the rate of depreciation upon Diesel engines by 10 p.ct. per annum; the increased allowance to remain in force for three years after the cessation of the war, when either the authorities or the taxpayer shall have the liberty to claim a revision.

A loss of nearly £9000 was made on last year's trading of the Walsall Corporation Electricity Department. Asked at a meeting of the Town Council to account for this state of affairs, the Chairman of the Electricity Committee said the concern had gone through an extremely difficult and trying time. It had been made very plain on several occasions that a loss was certain to result during the transition stage from the old works to the new works; and events had borne out this forecast. On the top of this, however, the concern sustained a loss which was altogether unexpected, and which was caused by the action of the Ministry of Munitions in commandeering plant which was intended for the new power station. The consequence was that, instead of the new works being brought into operation early in 1915, it was not until Feb. 10 this year that any plant was available for use; and the loss incurred was almost entirely due to this cause. He agreed that the outlook would be a serious one for ratepayers if they had to find the £9000; but he considered they had a strong claim against the Ministry of Munitions for compensation—it had already been sent in. It was hoped that early in September the Committee would have the new works in full operation; and they would then close the old works, at which the costs of generating current were very heavy.

BRASS WORK

WE HAVE A GOOD STOCK OF TAPS, &c.

Send us your enquiries.

SAWER AND PURVES

(Branch of Meters, Ltd.)

MANCHESTER. NOTTINGHAM.

STUDY OF GAS ENGINEERING AND MANUFACTURE.

Battersea Polytechnic Course.

The desirability has been realized for some time past by the Governors of the Battersea Polytechnic of instituting a full-time course of training in gas engineering and manufacture, to prepare as engineers or chemists youths who desire to enter the gas industry. In view of the developments that are taking place in gas manufacture and allied industries, the Governors feel that this step should be no longer delayed; and they have therefore decided to start a three-year full-time course for youths of 16 or 17 years of age.

The scheme of instruction has been drawn up in co-operation with the representatives of some of the larger gas companies, who have offered facilities for students to visit their works, and study the various operations connected with the gas industry as carried on under commercial conditions. The aim of the course is to give, primarily, a thorough training in the general principles of chemistry, with special reference to the requirements of the gas industry, including the economic aspect of manufacturing chemistry, together with such knowledge of engineering as shall make the student familiar with the fundamental principles of engineering construction and design, and with the operation of common engineering and chemical plant. The course of study will therefore embrace inorganic chemistry, organic chemistry, physical chemistry, physics, mathematics, engineering, gas manufacture, technical analysis, industrial economics, and German.

Students who work satisfactorily through the course, and pass the Polytechnic examinations, are eligible for the award of the Polytechnic diploma in "Gas Engineering and Manufacture." Students who have passed the matriculation examination prior to commencing the course may, in addition, work for the B.Sc. pass or honours degree in "Chemistry," and, if successful in this, for the associateship of the Institute of Chemistry later. The course of training is open to youths of 16 or 17 years of age who have had a good general education.

The Polytechnic session comprises about 38 weeks, extending from the middle of September to the middle of July. The next session begins on Sept. 25. The fee for the full-time course of work is £13 13s. per session, or £5 per term.

The Principal of the Polytechnic is Dr. F. H. Newman, M.A.; and the Head of the Department of Applied Chemistry is Mr. J. Wilson, M.Sc., F.I.C.

Mr. J. A. Taylor, of Bradford, and son of a well-known Batley magistrate and public man, was found dead in his bed last week with a rubber tube lying near, connected with the gas-bracket, which was turned on. At the inquest, the jury found that death was caused by coal-gas inhalation, while in an unsound mental condition brought on by worry.

GAS-WORKS AND ALLOTMENT GARDENING IN AMERICA.

The American nation, as a whole, is at the present time strongly impressed with the importance of preparedness, probably to some extent on account of the fact that in respect to many important features incidental to the war the British nation has proved to be a year or more behindhand, and that the consequent loss of life, property, and prestige is enormous. Our belated endeavours to increase the home production of cereals, fruit, and vegetables are a case in point. They are not only advocating increased production, but encouraging all methods of bottling and preserving for winter use. As has already been recorded in the "JOURNAL," a national canning campaign is being promoted by the National Commercial Gas Association, one item in which is the issue of appropriate folders each month, describing the methods of preserving current crops; and this enterprise will bring the subject to the prominent notice of gas undertakings.

The advent of war has given a great impetus to the community garden idea among gas companies, says the "American Gas Engineering Journal." Hitherto regarded only as a branch of employees welfare, the backyard vegetable garden is now recognized as a national asset. It will help the nation by releasing wholesale supplies for the needs of the allies, and will aid the individual in meeting the higher cost of living and increased taxation that is inevitable. All gas companies should therefore get behind the home garden idea. A few examples of activity in this direction may be quoted. The Rochester Railway and Light Company offer several acres of spare land, to be assigned to employees in order of request (suitable forms for which have been provided) in plots of 50 ft. square, or smaller if preferred, and will furnish ploughing, fertilizers, and seed at cost. In order to facilitate adequate cultivation, the Company are adjusting working hours, to enable employees to be at liberty earlier in the afternoons. A large shareholder in the Portland Gas Light Company has placed 10 acres of land at the disposal of the staff; and they have organized a "Potato Club," which includes several young women, and are planting this year one half of the area with vegetables—utilizing the experience of a few members that happen to have been brought up on farms. They propose to devote spare time and holidays to an extensive programme, including the rearing of pigs. The Twin State Gas and Electric Company at Burlington, Vt., are ploughing 7 acres of land, and planting it with potatoes. The Attleboro Gas Company (Mass.) have offered the use of a large tract of land for allotment cultivation, in common with other owners in that district. Farm lands in which the Denver Gas and Light Company are interested will produce at least 180 tons of potatoes this season, the whole of which will be offered, in the first instance, to the employees at bare production cost, which is estimated to be less than ¾d. per pound.

The "Frankfurter Zeitung" learns that in a few weeks gas consumption in Germany will be regulated and gas tickets issued.

"PIONEERS" OF BLUE WATER GAS.

FOR "JOINT USE" WITH COAL GAS,

DEMPSTERS IMPROVED

BLUE WATER GAS

APPARATUS IS THE BEST.

UPWARDS OF 65,000

CUBIC FEET PER TON OF COKE.

R. & J. DEMPSTER, LTD.,

London Office:
165, Gresham House,
Old Broad St., E.C. 2.

MANCHESTER.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 30.

Inquiry for pitch over next season continues good, and it is reported that 44s. per ton net in bulk at makers' works has been paid. Creosote is unaltered at 4¼d. per gallon net in bulk; but the recent Government order is restricting business. Solvent naphtha is steady at 2s. 2d. to 2s. 3d. per gallon net at makers' works. There is no change to record in other tar products.

Steady business is being done in sulphate of ammonia at the prices fixed by the Government.

Tar Products in the Provinces.

July 30

There is nothing fresh to report concerning the markets for tar products.

The average values for gas-works products during the week were: Gas-works coal tar, 20s. to 24s. 6d. Pitch, East Coast, 16s. 6d. to 17s. 6d. per ton; West Coast—Manchester 15s. 6d. to 16s. 6d., Liverpool 16s. 6d. to 17s. 6d., Clyde 17s. to 18s. nominal. Benzol, 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 3¼d. to 3¾d. Heavy oils, in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60 p.ct., East and West Coasts, 3s. 4d. naked. Naphthalene salts, 80s., bags included. Anthracene, "A" quality, 3d. per unit; "B" quality, 1½d. to 2d.

Gas Complaints at Shipley.—At the last meeting of the Shipley District Council, the Gas Committee reported the receipt of a number of complaints of increases in gas consumption for the half year ended June 30, to an extent which the consumers could not understand; and it was suggested that the accounts were inaccurate. The Committee had considered the matter at length. The heating value of the gas, it seemed, had been somewhat depreciated, in consequence of the extraction of benzol. There had also been some depreciation in the quality of the gas owing to a breakdown of part of the plant at the works. There might also be defects in the meters. The Committee had instructed that the meters be tested, and, if proved inaccurate, that an allowance be made on the accounts. Otherwise the Council were bound to charge for the consumption indicated by the meters. The Chairman of the Council expressed relief at hearing a full and clear explanation of this matter. There was no doubt there had been a considerable increase in consumption; and this was not altogether the fault of the Committee. The Committee thought there would be no further cause for complaint.

COAL TRADE REPORT.

Northern Coal Trade.

The coal trade is quiet. In the steam coal trade, best Northumbrians are fairly steady at 33s. per ton f.o.b.; second-class steams are dull at about 25s. 6d.; and steam smalls are plentiful at from 18s. 6d. to 20s. 6d. In the gas coal trade, the demand shows a steady increase, and Durham descriptions upon the whole are better situated than Northumbrian, for the latter depend more on the export trade. Best Durham gas coal is about 25s. per ton f.o.b.; second-class gas qualities are from about 24s. to 24s. 6d.; and for "Wear specials" the current quotation is from 29s. to 30s. The home consumption is now steadily increasing; but there appears to be at present a more ample supply. Little is just now doing in forward contracts; but some seem to have been arranged for a few months ahead; and on these deliveries have commenced. The full demand for coal for the controlled establishments helps to take up well the production of Durham coal, and lessens the quantity available for export. Freight on gas coal is firm; and is indicated as from 15s. to 15s. 6d., Tyne to London. Gas coke is in fair inquiry at from 30s. 6d. to 32s. 6d. per ton f.o.b.

Salaries of Manchester Gas Officials.

At the last meeting of the Manchester Gas Committee, several officials were recommended for advances of salary, consequent on rearrangement of the departmental work as a result of the death of Mr. T. Harrison, the Chief Deposits Clerk. It is proposed that Mr. F. J. Caldecott, Chief Rental Clerk (who has been in the service nearly 40 years), be given control of the Deposits Office, and that his salary be advanced from £410 to £450 per annum. Mr. W. S. Brocklebank, Principal Assistant to the Chief Rental Clerk (22 years' service), from £215 to £235. Mr. Geo. Hodson, Manager of the Gas-Stove Show-Rooms (39 years), from £250 to £270. Mr. Thos. Hill, Senior Assistant in the Deposits Office (25 years, and at present on war service), from £175 to £195, to date from his discharge from the army. Mr. Thos. Bannister, now acting as Senior Assistant in the Deposits Office (22 years), £163 to £180. Mr. Henry Sibbles, Assistant Receiver in the Deposits Office (21 years), £163 to £180. Mr. H. C. Atkinson, Assistant Receiver in the Deposits Office (20 years, and at present a Captain in the R.F.A.), from £158 to £180, to date from his discharge from the army. The Gas Committee point out that the late Mr. Harrison had a salary of £350 per annum; and the total of the advance of salaries and wages is £218 per annum. But as £83 is withheld until the men interested are discharged from the army, the net saving at the moment is £214. The ultimate saving will therefore be £131 per annum. It is thought only right, says the minute of the Gas Committee on the subject, that the men in the army should have their interests protected, as they would in all probability have received the increases mentioned had they been now in the Committee's service.

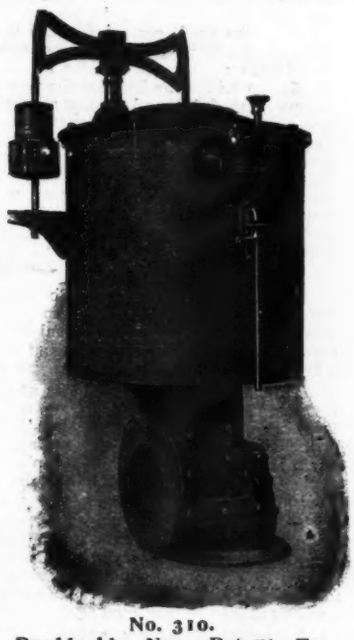
BRADDOCK'S RETORT-HOUSE GOVERNORS

HAVE PROVED TO BE

SECOND TO NONE.

Many repeat orders have been received.

Braddock's New Patent Retort-House Governor is a further improvement and is especially desirable for use with Vertical Retorts.



No. 310.
Braddock's New Patent Enclosed Retort-House Governor. Latest Type.

Further Particulars upon Application.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), Globe Meter Works, **OLDHAM.**

Telegrams: "BRADDOCK, OLDHAM." National Telephone No. 815.

AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E. 1.

Telegrams: "METRIQUE, LAMB LONDON." Telephone No: 2412 HOP.

Coal Distribution Scheme.

With regard to the scheme of the Coal Controller for the equal distribution of next winter's coal, to which reference is made in our editorial columns to-day, it may be mentioned that the scale of rations between Oct. 1 and March 31 is fixed as follows:

Size of House.	Coal per Week.
3-5 rooms	Up to 2 cwt.
6-7 rooms	Up to 4 cwt.
8-9 rooms	Up to 5 cwt.
10-12 rooms	Up to 6 cwt.
Over 12 rooms	Up to 8 cwt.

From April 1 to Sept. 30 the allowance will be half the winter ration.

Wages Award at Plymouth Gas-Works.

The award was published last week of Mr. A. J. David, K.C., who sat as arbitrator on behalf of the Government in reference to the claim of certain workmen of the Plymouth Gas Company for an advance of wages. The case was argued on the 6th inst.; the claim of the workmen being supported by the Dockers' Union, which a number of the workmen have recently joined. Mr. P. S. Hoyte (Engineer and Manager), Mr. Geo. H. Bolton (Secretary), and Mr. J. W. Walters (Works Foreman) represented the Company; and two of the Union officials, together with two of the workmen, appeared in support of the men's case. On behalf of the men, the demand was: (1) That all present rates should be consolidated and regarded as standard wages; and (2) that a further increase of 8s. a week should be given to adults, and a further sum of 4s. a week to juniors, to be regarded as conditional wages. Mr. David by his award decided: (1) That the present rates shall not be consolidated and regarded as standard wages; and (2) that an increase be made in the war bonus of 2s. per week for adults, and 1s. per week for youths under 21 years of age, to continue for the period of the war. The award takes effect from the date of the hearing. Some of the workmen were not parties to the application, but continue members of the co-partnership, one of the conditions of which is that they shall not join a trade union. Under the award, however, all share alike in the increased war bonus.

Darwen Gas and Electricity Departments Contrasted.

In a review of the accounts of the Darwen Corporation for the past financial year, Mr. S. Crook (the Borough Treasurer) says twelve months ago attention was drawn to the high prices ruling for coal and materials generally. "This condition has," he says, "been accentuated during the year; and, coupled with the demands for increased wages and the scarcity of labour, some of the Corporation departments have passed through very trying stages." Mr. Crook's survey of the gas undertaking reads: The year's working of the Gas Department resulted in a loss of £1029. War separation allowances paid to the dependants of gas-works employees cost £202, making a total deficit of £1232 for the year. At the commencement of the year there was an undisposed-of balance of profit amounting to £2161. The profit carried forward is thus reduced to £929. The sales of gas, in round figures, amounted to 169,766 000 c.ft., as compared with 187,530,000 c.ft. for the previous year, or a decrease of 17,764,000 c.ft. The loss for the year on the Electricity Department amounted to £2695, and the war separation allowances to £194. The loss brought forward at the commencement of the year was £385. Deducting from these sums the grant-in-aid made from the general district rate during the year, it will be seen that there is an adverse balance against the department of £2631. The capital expenditure on the electricity undertaking now amounts to £81,605. The department has received aid through the general district fund since its inception of £2635, and paid in aid of the rates at various times sums amounting to £3270.

Tideswell Gas Company.—The annual meeting of the Company was held on Wednesday last, when the Chairman (Mr. T. Cooper), in moving the adoption of the annual report, said the undertaking, like many others, had been badly hit; but they were in a position to declare a dividend of 5 p.ct. The price of gas was increased 6d. per 1000 c.ft.

Plumbers' Holidays with Pay at Bury.—At the last meeting of the Bury (Lancs.) Gas Committee, a letter was read from the local Secretary of the Operative Plumbers' Association, making application, on behalf of their members, for four days' holiday annually with pay. It was resolved that the application be granted, and that it apply to all the men employed at the gas-works.

The Alleged Gas-Works Nuisance at York.—At a meeting of the York Corporation Health Committee, the Town Clerk stated that the Council had decided that the Committee should report further upon the nuisance at the gas-works to an early meeting of the Council. It was agreed that notice should be served upon the Company requiring them within three months to abate the nuisance, failing which proceedings should be instituted against them.

Exhauster Governors at the Tottenham Gas-Works.—In our issue of the 12th ult. reference was made (when reporting the visit of the Institution of Gas Engineers to the Tottenham Gas-Works) to the turbo-exhausters of the British Thomson-Houston Company. It was said they were fitted with "Donkin" governors. This statement was not correct; and Messrs. George Waller and Son, Ltd., ask us to state that the governors fitted to the machines are "Waller" governors, supplied by the firm.

Chelmsford Gas-Works Transfer.—The Gas Committee of the Chelmsford Town Council state that Messrs. Torr, Durnford, & Co. have now intimated that the Chelmsford Gas Company are prepared to accept payment of £1090 in settlement of the sum of £1138, incurred by the Company for costs in connection with the transfer of the gas undertaking. Messrs. Torr, Durnford, & Co. have already been informed that the Corporation are willing to settle the matter upon payment of the sum of £1050; and the Gas Committee have directed the Town Clerk to confer again with them on the subject.

Slot Installations

Our compact Combination Set is solving the fitting-up problem.

A Slot Meter.
A Cooker at working height.
A Plate Rack with enamelled back plate.
A Towel Rail
and
An Inverted Burner together with T-piece connection for extensions.

Saves labour, material, and space.

Let us send you full particulars.

R. & A. MAIN, LTD.

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES: 25, PRINCES STREET, OXFORD CIRCUS, W.; 82, Gordon Street, GLASGOW; 83, Old Market Street BRISTOL; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 3, Queen Street MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

Birkenhead and Meter-Rents.—There was a long discussion in the Birkenhead Town Council over a resolution of the Gas Committee to the effect that, as from July 1, a quarterly rental should be charged for the hire of gas-meters (other than prepayment meters), according to size. It was pointed out by Alderman M'Gaul, the Chairman of the Committee, that the suggestion was not an innovation, as meter-rents were payable until a few years ago. A proposal to refer the matter back was lost by twelve votes to thirteen; and the minutes were adopted.

Wages at Burton-on-Trent.—The Burton Town Council have agreed to a recommendation of the General Purposes Committee, that additional war bonuses be granted as follows: Able-bodied men, 5s. per week; youths between 17 and 21 years, 3s.; youths up to 17 years, 2s.; women, 3s.; girls between 15 and 21 years, 2s.; and that the first payment of the increased bonuses be made on the first pay day after the Council adopt the proposals. The foregoing not to apply to the men excepted at the arbitration in March, 1916. As to the staff, the war bonus of 5 p.ct. now paid is increased to 7½ p.ct. on salaries up to, and including, £140 per annum; and a bonus of 5 p.ct. is to be paid on salaries over £140 and up to £200 in the case of all married men. This does not apply to the Education Committee staff, whose case is being dealt with by that Committee. A majority of the men regard the decision arrived at as an unsatisfactory one.

Wages Arbitration at Todmorden.—The Todmorden Corporation employees' application for increased wages is to be referred to arbitration; the Corporation's offer having been refused. This offer, which holds good if the men care to accept it, is an additional war bonus of 2s. 6d. per week to all employees (other than carters and employees of the Education Department) earning less than £150 per annum; the bonus to commence from the first pay day in June last, and to continue to the expiry of six months after the end of the war. The offer applies to whole-time regular employees; a separate additional bonus being offered for casual or part-time workmen.

Losses at Accrington.—A meeting of the members of the Accrington Gas and Water Board will be held early in August, to consider the statement of accounts for the past year, and what steps to take to meet the loss incurred on the gas undertaking. Locally, the Accrington consumers are contrasting the position with that of the neighbouring district of Oswaldtwistle, where, with gas at 2s. 9d. per 1000 c.ft., a profit of over £1000 was made last year [*ante*, p. 167]. The price of gas at Accrington is 3s. 1½d. per 1000 c.ft.; but, in justice to them, it has always to be remembered that the Accrington Gas and Water Board bear a heavy burden in the way of repayments and annuities on a huge purchase price, with which the Oswaldtwistle undertaking is not saddled.

STOCK MARKET REPORT.

AFTER the long continued attitude of firmness and unimpaired cheerfulness which has been the pleasing characteristic of the Stock Exchange for a good many weeks past, a decided change in the general position supervened last week. As a set-off against the satisfactory operations upon our Western front came the sad news from the Eastern battlefields, showing to how great an extent the poisonous corruption of Russian troops by traitorous pacifists had spread. Another factor to influence markets adversely was the 650 million vote of credit which set people thinking, and frightened some of them when the late Chancellor hinted at an increase in the income-tax. Markets in this way underwent a *volte face*; and those that had been soaring the highest, of course, had the farthest to fall.

The gilt-edged market was one of them. Home Government issues eased-down, with the exception of the tax-free 4 p.ct War Loan, and Indian and Colonial accompanied them. Home Rails slacked-off persistently, and there was no difficulty in finding stock, if anybody wanted it. Americans were dull and neglected, and Argentines were only middling, though the last figures were not the worst of the week. South Africans had a dull time.

The Foreign Market was not exempt from prevailing depression, though there were one or two brighter spots here and there. Russians, of course, were prominently affected, though there was a momentary pause in their downward course, and Brazilians were set-back by adverse exchange. But Dutch, Scandinavian, and Chinese issues were firm.

Business in the Gas Market made no recovery in point of volume; the aggregate of transactions bulking no larger than the array the week before. But it was much more fairly distributed throughout the list, quite a good many undertakings changing hands which but seldom make a public appearance. The general tone was steady; prices showing hardly any change in the bargains marked, and quotations only varying for *ex div.* adjustment. Gas Light and Coke announce a full statutory dividend of £3 14s. 8d. p.ct. per annum, and Tottenham District similar dividends at the rate of 5⅛ p.ct. on the "A" stock and 4 p.ct. on the "B" stock. The dividends paid six months ago were 5 p.ct. and 3⅛ p.ct. respectively.

Bargains done for cash during the week were as follows: On Monday, Brentford "A" 81, Croydon "B" and "C" 173⅛, 174, ditto "D" 93½, Gas Light ordinary 71, 71⅛, Hornsey 110½, Ilford "A" and "C" 94, Imperial Continental 79⅛, 80, Monte Video 8⅛, South Metropolitan 73½, 75. On Tuesday, European £12 3s. 3d., £12 5s., Gas Light ordinary, 69, 71⅛, ditto preference 73, ditto debenture 56¼. South Metropolitan 74¼, 74½, 75. On Wednesday, Barnet "D" 100½, 101, Croydon "D" 93⅛, ditto 4 p.ct. debenture 75, Gas Light ordinary 69, 70, 71, ditto preference 73, 73⅛, 74, ditto debenture 56⅝, Imperial Continental 80, Primitiva debenture 79, South Metropolitan 73⅛, 74, 74¼, Southgate 10 p.ct. 142, 142½. On Thursday, Bombay 5, Brentford "B" 76, Bournemouth preference, 9⅜, Commercial 4 p.ct. 72½, 73, Gas Light ordinary 69⅜, ditto maximum 56½, ditto debenture 56¼, Guildford 90½, 91, Primitiva debenture (1911) 59¼, 60, South Metropolitan 74, 74¼. On Friday, Continental Union 39½, Imperial Continental 79½, Primitiva 39s.

The Bank rate is 5p.ct., as fixed on April 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When last Dividend.	Previous Div or Dividend and Bonus.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	58—63	..
1,551,868	,,	April 8	2½	5⅛%	Alliance & Dublin Ord.	59—64	50—55	..
374,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	57—62	..
280,000	5	April 29	7½	4/6	Bombay, Ltd.	5⅞—6⅛	4⅜—5⅛	5
50,000	10	Feb. 26	16	15/-		29—30	24—26	..
383,110	10	,,	7	7/-	Bournemouth Gas and Water { 10 p.c. B 7 p.c. Pref. 6 p.c. 4 p.c. Deb.	15—15¼	10½—11½	..
115,000	10	,,	6	6/-		13½—14	9½—9⅞	9⅝
159,740	—	—	—	4%		..	69—71	..
992,045	Stk.	Feb. 26	14	5¼%	Brentford A Consolid.	261—266	79—83	81
734,290	,,	,,	11	4¼%	Do. B New	204—209	77—80	76
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	81—86	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	65—67	..
217,380	,,	Feb. 26	11	10%	Brighton & Hove Orig.	208—213	150—155	..
244,200	,,	,,	8	7%	Do. A Ord. Stk.	154—159	102—107	..
530,000	20	Mar. 26	12½	22/6	British	44—45	33—34	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	66—68	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	5⅛—56	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1⅝—2⅛	2⅛—3	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	6⅛—7⅛	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	7⅛—80½	..
1,513,280	,,	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106—108	72—74	72½—73
560 000	,,	,,	5½	46/8	Do. 3½ p c. do.	103—105	66—68	..
475,000	,,	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	39—41	39½
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	60—62	..
278,400	,,	,,	—	11½%	Croydon B and C 7 p.c.	..	170—180	173½—174
—	—	—	—	10⅝%	Do. E	..	..	..
492,270	Stk.	—	6	5½%	Derby Con. Stk.	123—125	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	7/6	European, Ltd.	17⅛—18	11⅛—12⅛*	12/3/3—12/5/-
16,313,430	Stk	Feb. 10	4/17/4	37/4	Gas Light and Coke { 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb. 10 p.c. Bonds	98—102	67—69*	69—71½
2,600,000	,,	,,	3½	3½%		76—79	54—56*	56⅛
4,062,235	,,	,,	4	4%		96—99	70—72*	73—74
4,674 850	,,	June 11	3	3%		72½—74½	55—57	56½—56⅝
130,000	,,	,,	10	10%		..	..	..
258,740	,,	Mar. 12	5	4⅛%	Hastings & St. L. 3½ p.c.	87—89	50—55	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16⅝	7½—8½	..
26,600	—	—	—	9⅛%	Hornsey 7 p.c.	..	120—130	110½
131,000	Stk.	Mar. 12	7⅛	7⅛%	Ilford A and C.	151—154	95—100	94
65,780	,,	,,	6⅝	5⅞%	Do. B	115—118	75—80	..
65.500	,,	June 26	4	4%	Do. 4 p.c. Deb	92—94	65—68	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	79—84	79½—80
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	62—65	..
235,342	,,	Mar. 12	6½	6⅛%	Lea Bridge Ord. 5 p c.	119—121	85—90	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A B	211—213 / 146—148	82—83	..
306,088	,,	June 26	4	4%	Do, 4 p.c. Pr. Deb. Stk.	..	72—74	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4⅛—4⅜	3⅜—4*	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	88—98	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8—8½	8½
1,875,892	Stk.	July 29	4½	4½%	Newcastle&Gatsh'dCon.	98½—99½	70½—71	..
529,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—83	71—73	..
55,940	10	Feb. 26	7/14/0	7/10	North Middlesex 7 p.c.	14—15	10—11	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	104—106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅞	2—3	..
60,000	50	Feb. 26	13	12%	Portsea, Island B	128—131	92—97	..
100,000	50	,,	12	11%	Do. C	118—121	85—90	..
52,000	50	,,	10	9%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5⅛—6	1⅞—2⅛	39/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4⅜—5	2⅝—3⅛	..
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	78—80	79
—	—	—	—	4%	Do. ,, ,, 1911	..	..	59½—60
946,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	59—61	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10⅛—11	7⅞—8⅛	..
125,000	50	July 1	5	5%		47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	223—224		
209,984	,,	,,	10	10%	Do. B	224—224	178—182	..
523 500	,,	,,	10	10%	Do. C	220—222		
90,000	10	May 28	9	6/-	South African	10⅛—11⅛	8⅛—9⅛	..
6,609,895	Stk.	Feb. 10	5/4/0	46/8	South Met. 4 p.c. Ord.	111—113	73—75	73⅛—75
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72⅛—74⅛	55—57	..
224,820	,,	Feb. 26	8½	8%	South Shields Con. Stk.	157—159	140—142	..
952,795	,,	,,	6	48/4	S'th Suburb'n Ord. 5 p.c.	114—116	7 :—78	..
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	77—79	..
135,000	—	—	—	48/4	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	86—88	..
647,740	,,	May 14	5	5%	Southampton Ord.	99—102	76—78	..
120,000	,,	Feb. 12	7½	5%	Tottenham District { A 5 p.c. B 3½ p.c. 4 p.c. Deb.	135—138	95—100	..
782,275	,,	,,	6	3⅛%		115—117	68—73	..
181.255	,,	June 26	4	4%		87—89	63—65	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	89—91	..
30,000	,,	Feb. 26	8⅜	80/-	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	114—119	..
255,636	,,	,,	6½	65/-	Do. B 3½ p.c.	129—134	90—101	..
108,075	,,	,,	5/17/3	56/-	Do. C 3½ p.c.	110—115	86—91	..
352,000	,,	,,	6½	58/9	Wimbledon 5 p.c.	117—122	88—93	..
98,000	,,	,,	6½	65/-	Epsom 5 p.c.	121—126	96—101	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—53	..

* Ex. Div.

Gas-Fired Soft-Metal Furnaces.

A general outline of the more important soft-metal operations to which gas is applicable (exclusive of the melting and remelting of such metals as applied more particularly to the printers and allied trades), such as the making of Babbitt metals and white bronzes, salvage of pure metal from dross, tin coating, die casting, soldering, &c., is discussed in the "American Gas Engineering Journal," by Mr. Gilbert C. Shadwell. A list of soft-metal compounds as used by makers of table and fancy ware, lamps, and numerous small goods, in machine and railway shops, galvanizers, plumbers, &c., is given in full detail. The metals that can be melted over fan or blast gas burners are stated to be aluminium, antimony, bismuth, copper, lead, tin, and zinc. Typical illustrations of furnaces are included. Die casting is a comparatively modern method of producing castings in soft brass, or compounds of lower melting point that do not require to be machined.

A Leaving Certificate Refused.—At the Halifax Munitions Tribunal last Wednesday, John Hunt, a Corporation gas works labourer, sought a leaving certificate; his complaint being insufficient payment. It was said his wages were 33s. per 49½-hour week, which, according to Mr. G. Kaye (of the Workers' Union), representing the man, was lower than the payment of labourers in other employment in the town. It was stated for the Corporation that it had just been decided to advance their labourers' wages to 35s. per week. In view of this, the tribunal refused the certificate.

Composition and Quality of Gas.—At the quarterly meeting of the Executive of the Urban District Councils Associations, a letter was read from the Board of Trade asking the Association to nominate a technical representative to attend a conference with the Director of Fuel Research, Sir G. T. Beilby, F.R.S., in regard to the most suitable composition and quality of gas, and the minimum pressure at which it could be generally supplied, having regard to the desirability of economizing coal, the recovery of bye-products, and the purposes for which gas is now used. The Secretary was requested to see the Board of Trade and ascertain whether the invitation was addressed to the Association as representing urban councils supplying gas or as representing consumers of gas, and whether the expert should be a gas engineer or a chemist.

Moving a Testing-Station.—At the end of 1916, the London County Council decided to dispose of the site of the Westminster Gas-Meter Testing Station; and the place was closed last month. The Council have arranged, as a temporary measure, for the adaptation of a portion of the Harrow Road Weights and Measures Office for use as a gas-meter testing office, and for the transfer of the larger portion of the plant at the Westminster office. The removal of the plant involved some difficulty. Much of it is very heavy, and required the most careful handling; the essential parts being quite fragile. The ordinary testing work was, however, carried on without interruption.

Ossett Corporation Gas Charges.—The Shitlington Council lately received information from the Ossett Corportion of the advance in the price of gas by 3d. per 1000 c.ft., from the end-of-June reading of the meters. The new charge is 3s. 6d. by ordinary and 4s. 2d. by slot meters. The local Council vigorously protested against the increase, on the grounds of poor quality gas and that the district was already paying 3d. per 1000 c.ft. more than Ossett, Horbury, and Crigglestone. It was mentioned, in regard to the latter point, that Shitlington would be on the same level as the other places, if its consumption increased to a certain total. The Chairman said that was the reason Ossett gave; but Ossett knew very well the district could never reach this total. The view was generally voiced that at the end of the war the gas question must be looked into, and something done—Dewsbury being in mind. The meeting passed a resolution of protest.

We are informed that the business of Ernst Hildebrandt, Ltd., of Ravensbury Terrace, Earlsfield, S.W., has now passed into British hands, and that the name has, with the permission of the Board of Trade, been changed to the Clay Ring Company, Limited.

Thirty-six applications have been received for the post of Engineer and Manager of the Airdrie Corporation Gas-Works, rendered vacant through the appointment of Mr. J. W. M'Lusky to Blackburn. A provisional short list has been drawn up by the Committee; and it is intended that the candidates on it shall be interviewed. The Town Council meet on Thursday night; but it is expected that a special meeting will have to be held afterwards for the purpose of making the appointment.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

ENGINEER AND MANAGER. Seaford Gas Company. Applications by Aug. 8.
GAS MANAGER. Scunthorpe Urban District Council. Applications by Aug. 9.
MANAGER AND BUYER (Glass). No. 6331.
CHEMIST. Stretford Gas Company.
SALES MANAGER. Aldershot Gas, Water, and District Lighting Company.
MECHANIC. Kettering Gas-Works.
GAS FITTER. Frome Gas-Works.
STOKERS. Milton Regis Gas-Works.

Plant, &c, Wanted.

HIGH PRESSURE GAS BLOWER. Winders, Ltd. Leicester.
TANK WAGONS. No, 6330.

Patent Licences, &c.

GAS MANTLES. D. Young & Co., 11 and 12, Southampton Buildings, W.C. 2.
GAS MANTLES. Haseltine, Lake, & Co., 28, Southampton Buildings, Chancery Lane, W.C.

Meetings.

SOUTH METROPOLITAN GAS COMPANY. Cannon Street Hotel, Aug. 15, Two o'clock.
SOUTH SUBURBAN GAS COMPANY. Cannon Street Hotel, Aug. 10, Twelve o'clock.

TENDERS FOR—

Coal.
Burnley Gas Department.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

BANK HOLIDAY.

In consequence of the BANK HOLIDAY, Communications for the next issue of the "JOURNAL" and Orders respecting ADVERTISEMENTS should be received at the Office

NOT LATER than the FIRST POST ON SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 23s. 6d.; Half Year, 12s.; Quarter, 6s. 6d.
Payable in advance. If credit is taken, an extra charge of 4s. a year is made.

Abroad (in the Postal Union): £1 7s. 6d., payable in advance.
In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

"VOLCANIC" FIRE CEMENT.
Resists 4,500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

"FERROX." "FERROX." "FERROX."

A BRITISH Oxide Cheaper and Better than Bogore. 35 per cent. Water, 75 per cent. Ferric Hydrate. For Sale outright or on Loan.
OXIDE LIMITED, Brentford, MIDDLESEX.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, London, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB LONDON."

SEND your inquiries for Carburetted HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS to—
BALE AND HARDY,
39, VICTORIA STREET, WESTMINSTER, S.W. 1.

MEWBURN, ELLIS, AND PRYOR.
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70, Chancery Lane, London.
Telegrams: "Patent London." 'Phone: 243 Holborn,
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

OXIDE OF IRON.
SPENT OXIDE WANTED.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

"TORTO" FIRE CEMENT.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 680.

"KLEENOFF," THE COOKER CLEANSER.
Tins for sale to Consumers.
In Bulk for Works Use.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C. 3.
Phone: Avenue 6680.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, May 15, p. 968.